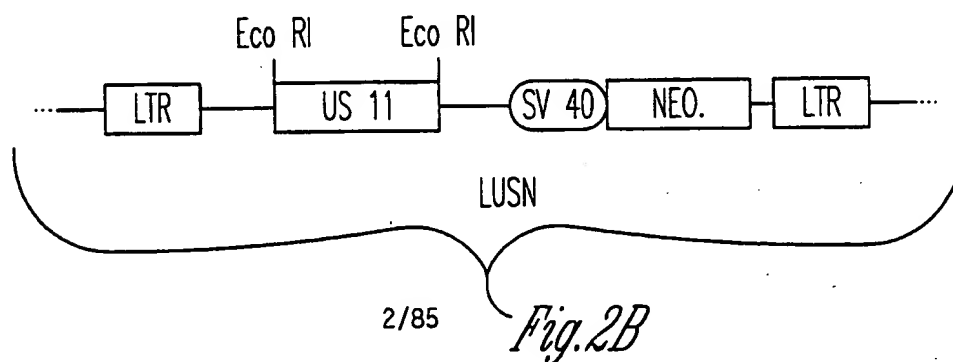
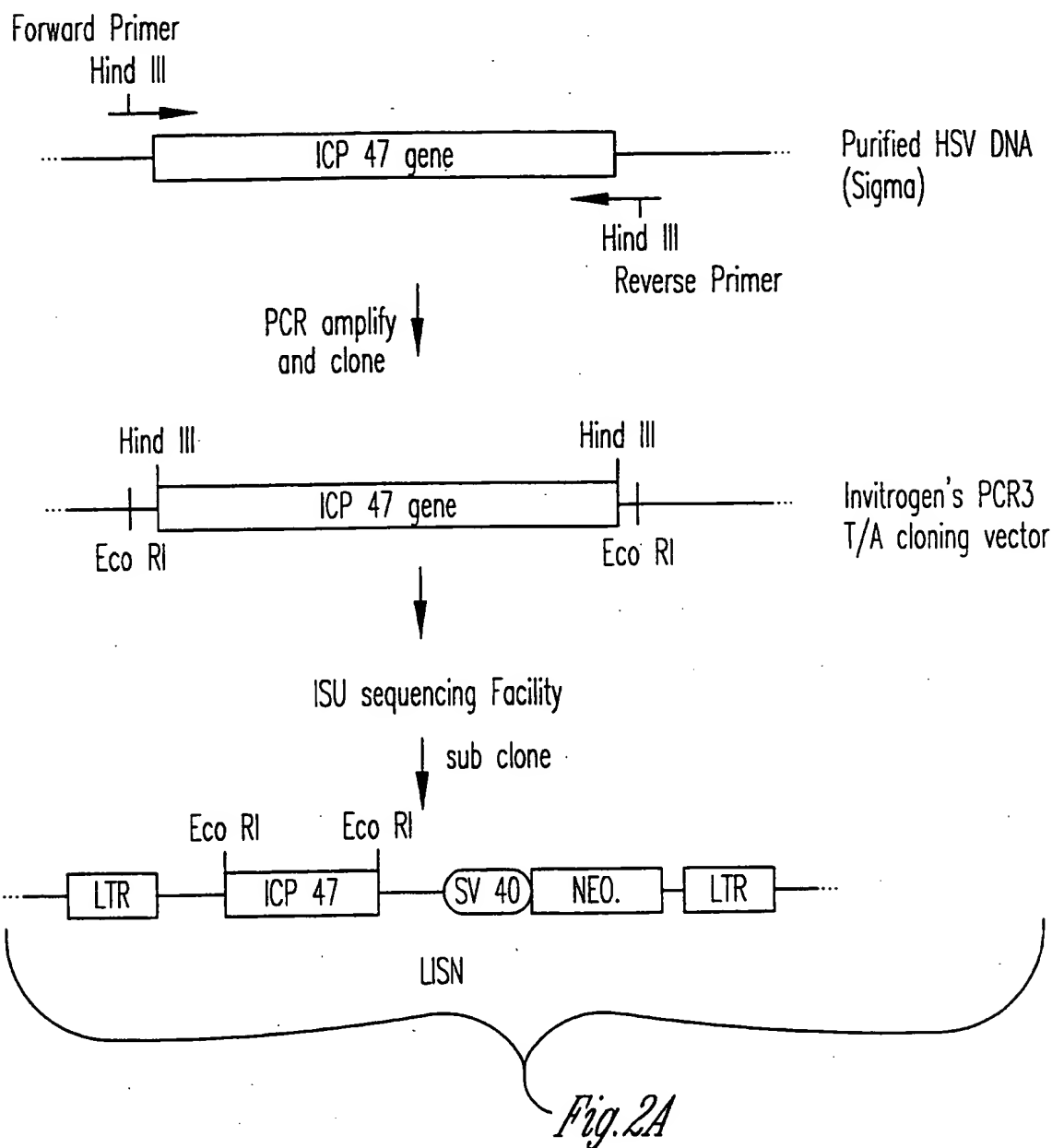


Fig. 1



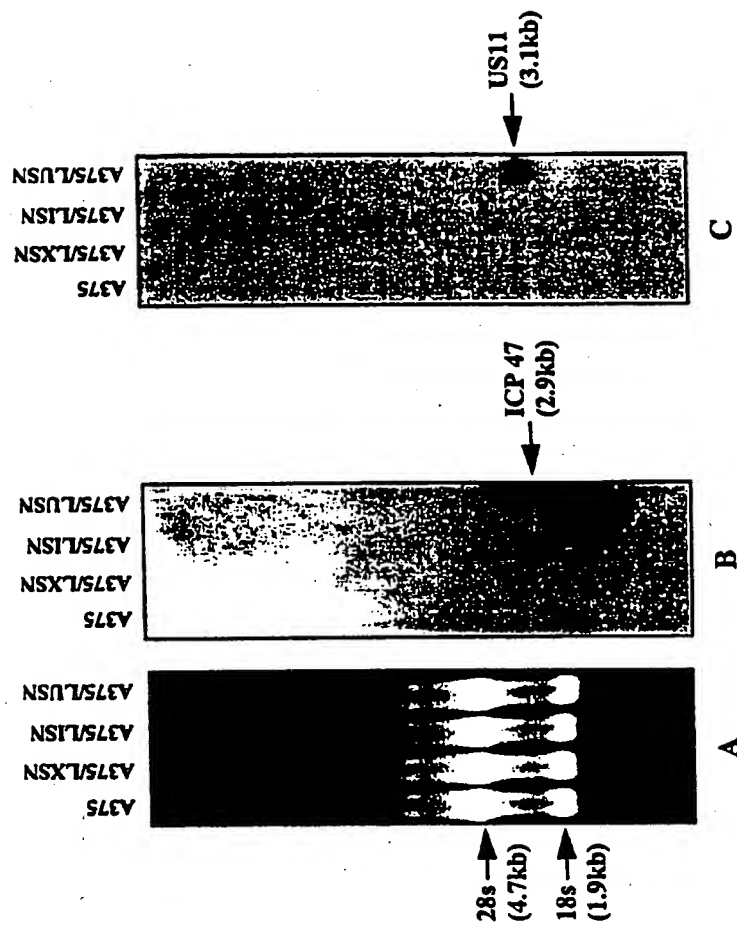
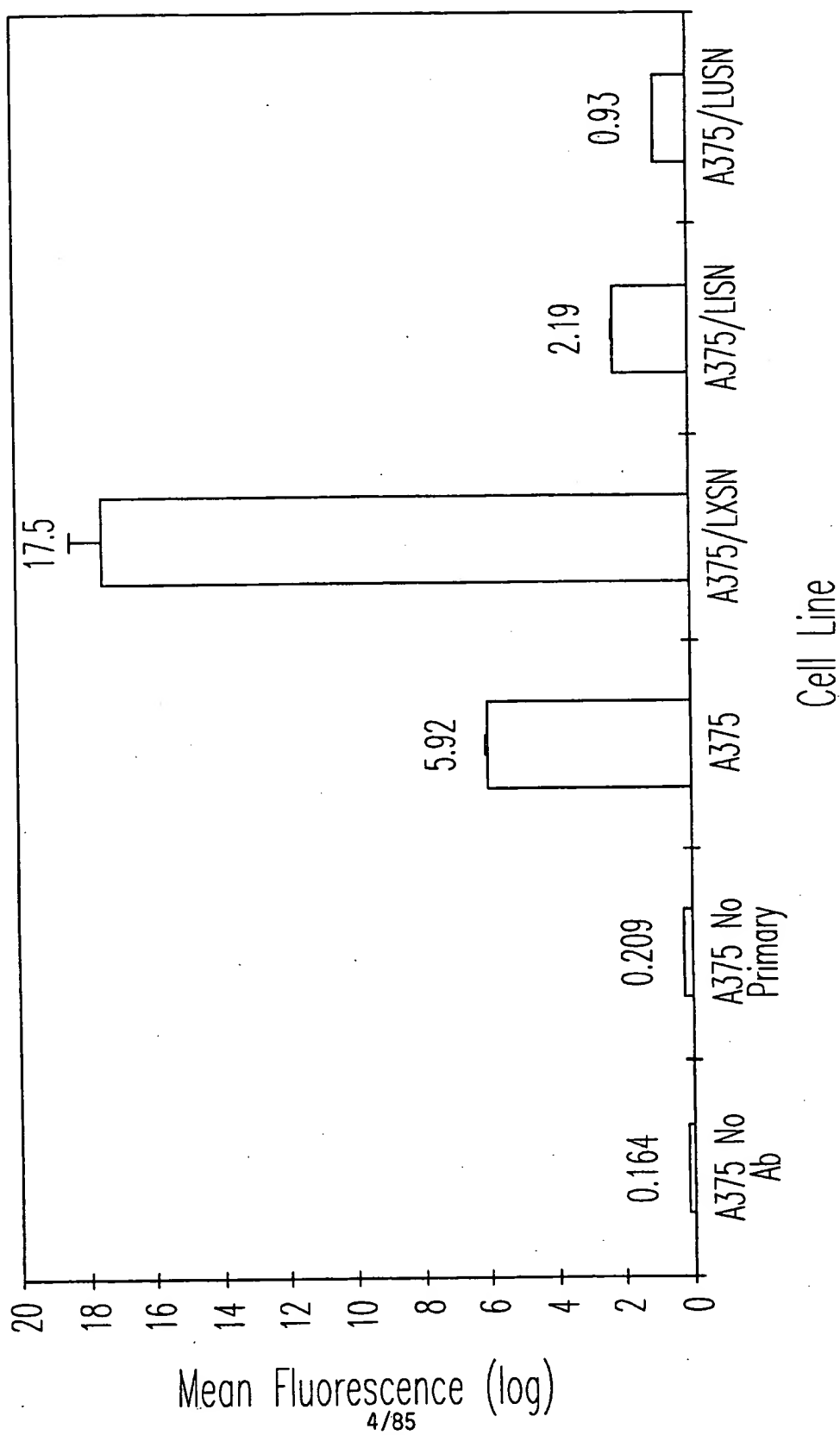


Fig. 3



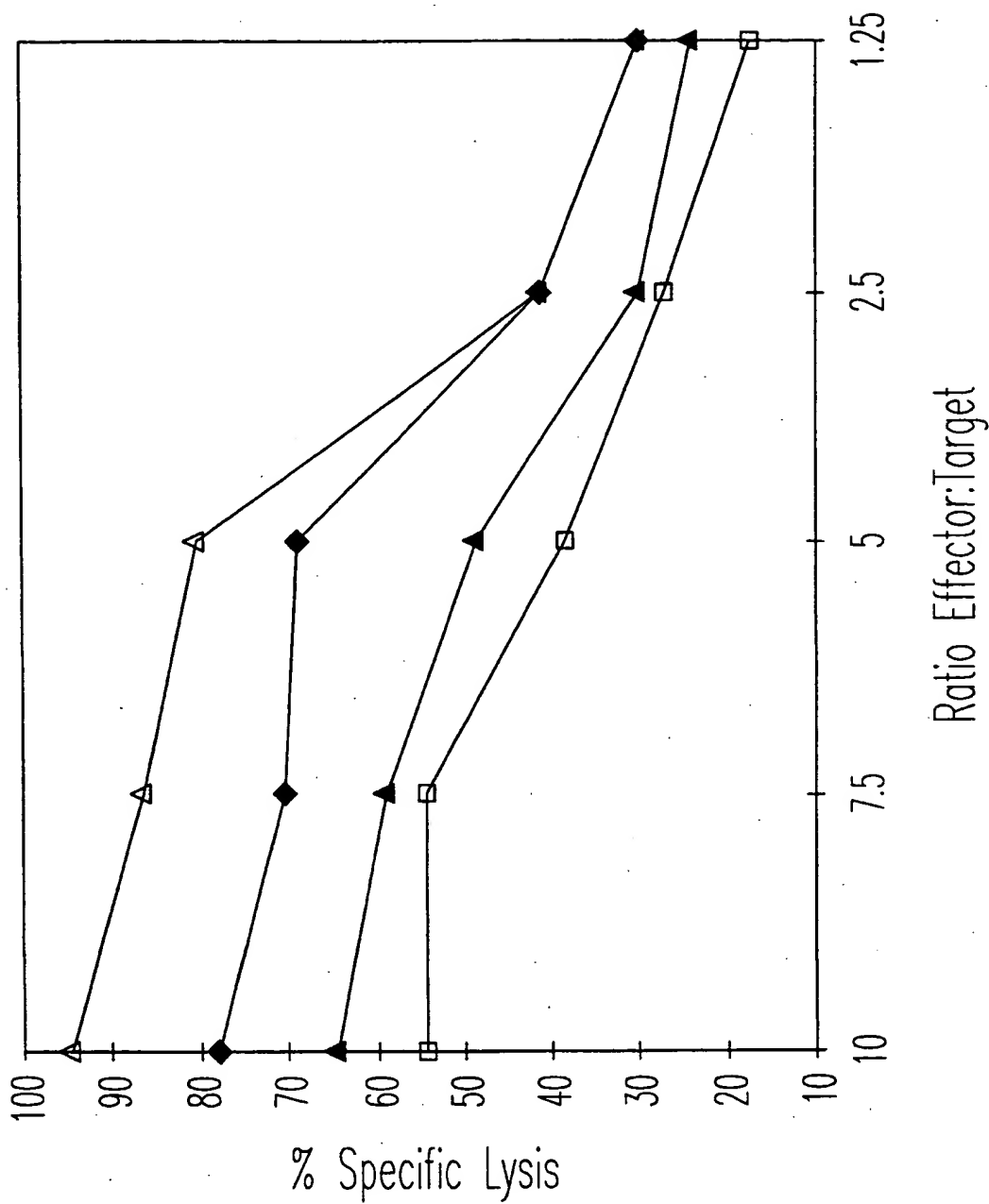
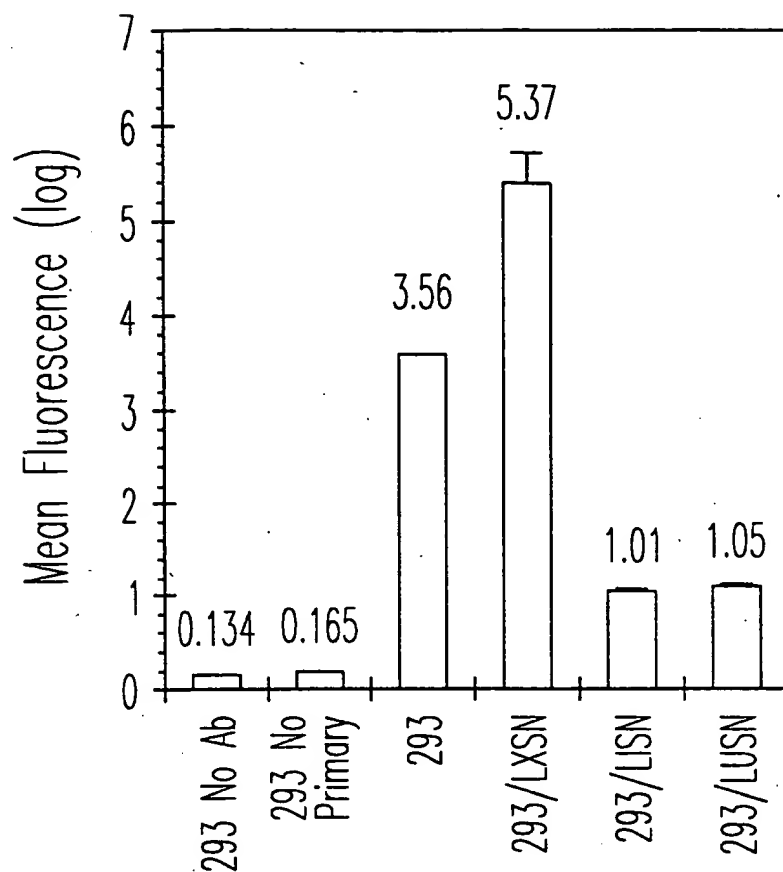
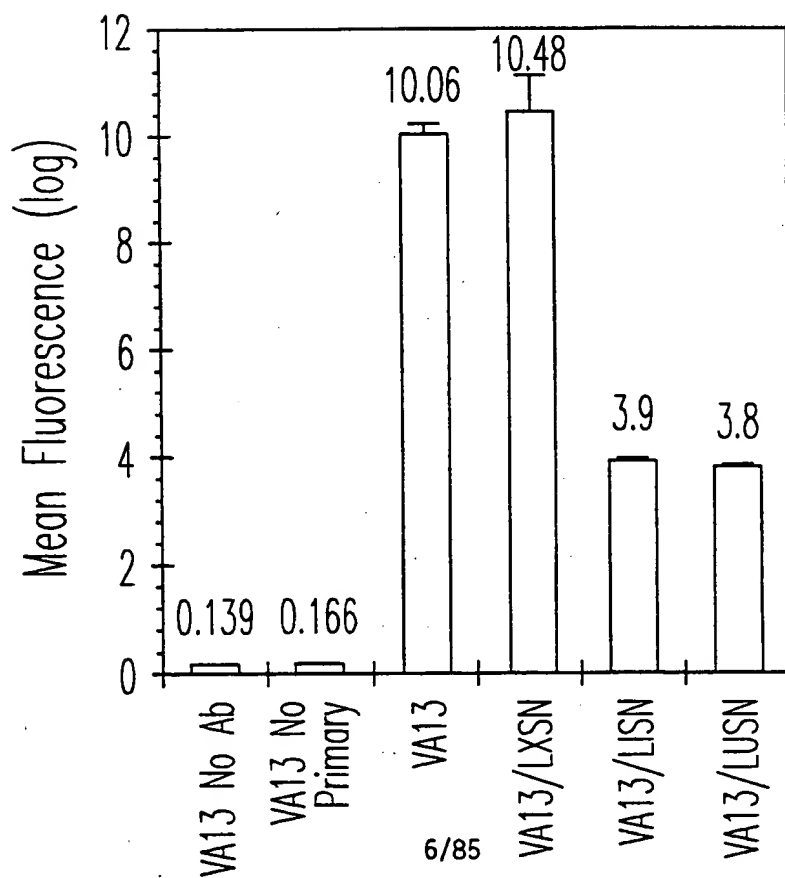
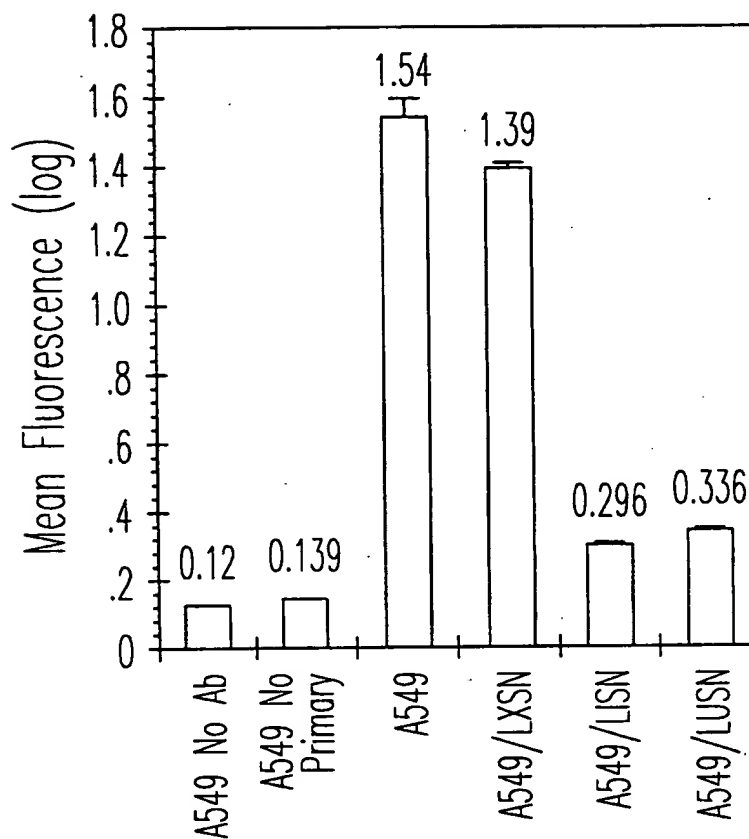
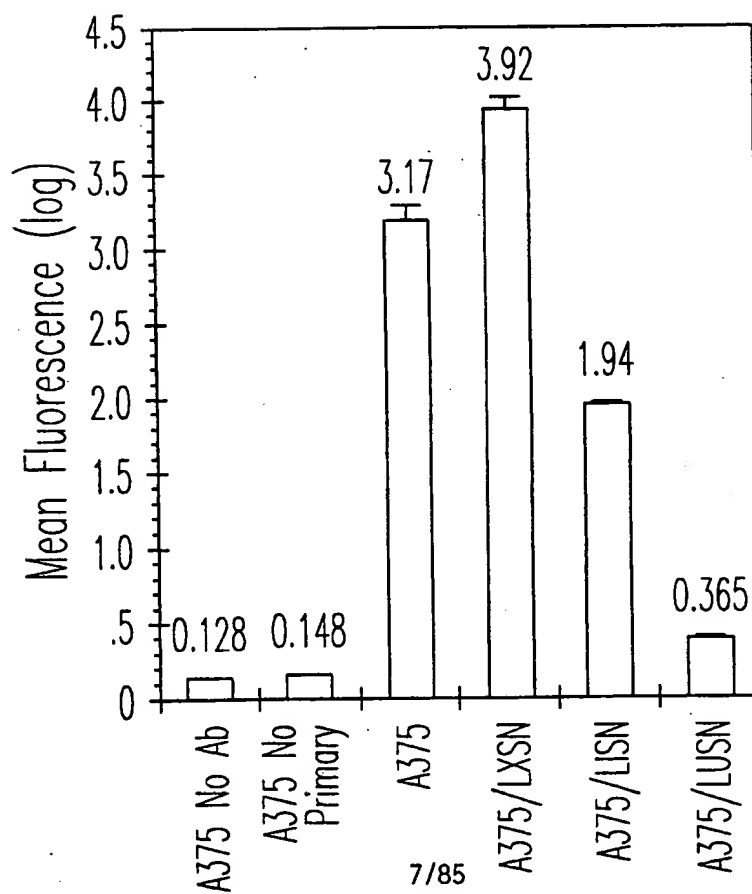


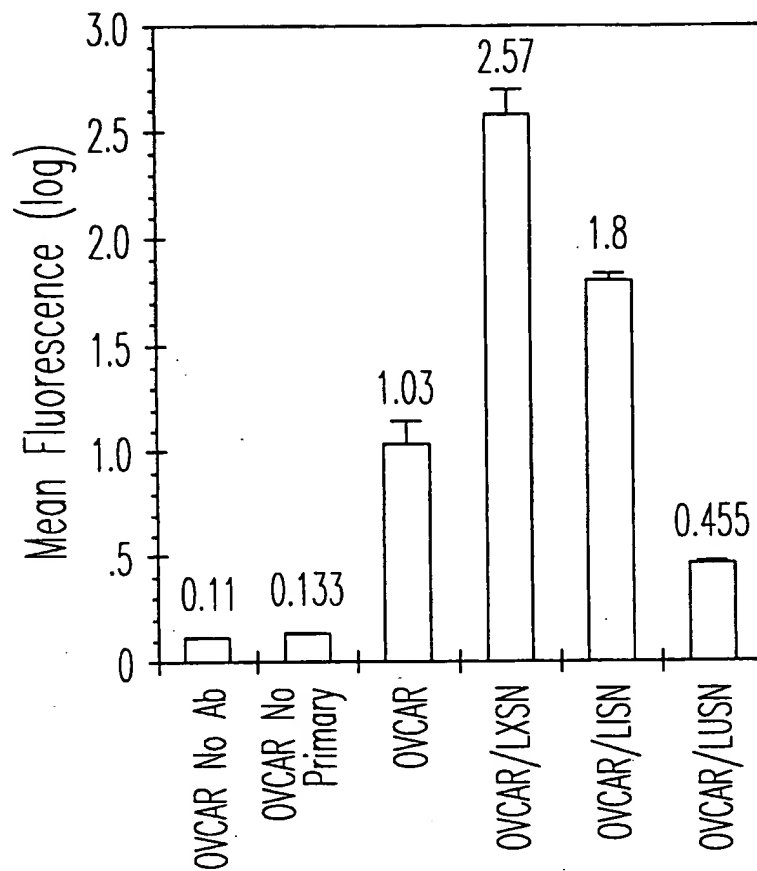
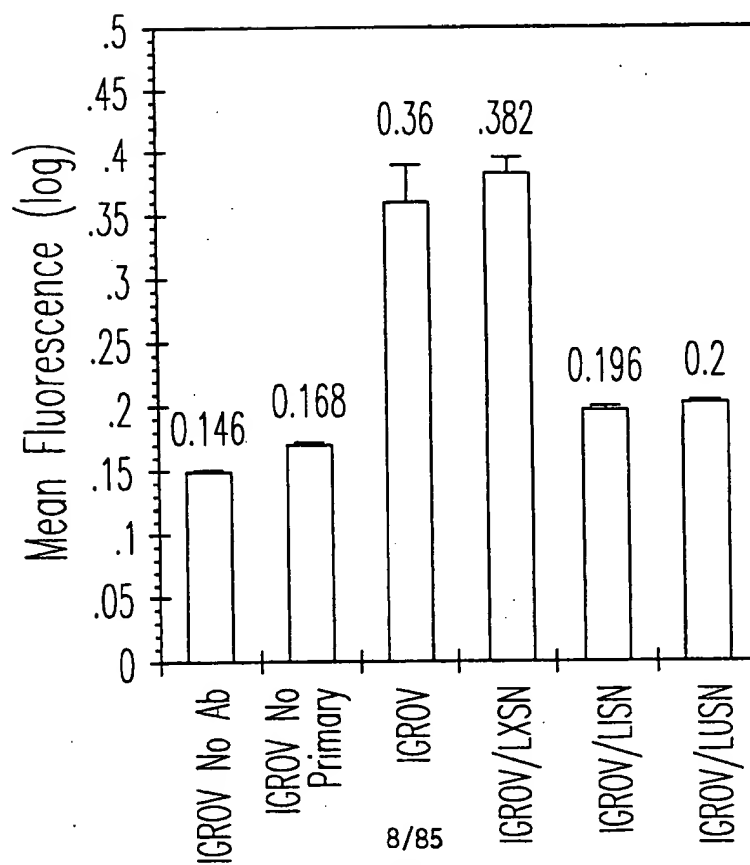
Fig. 5

—◆— A375  
 —△— A375/LXSN  
 —▲— A375/LISN  
 —□— A375/LUSN

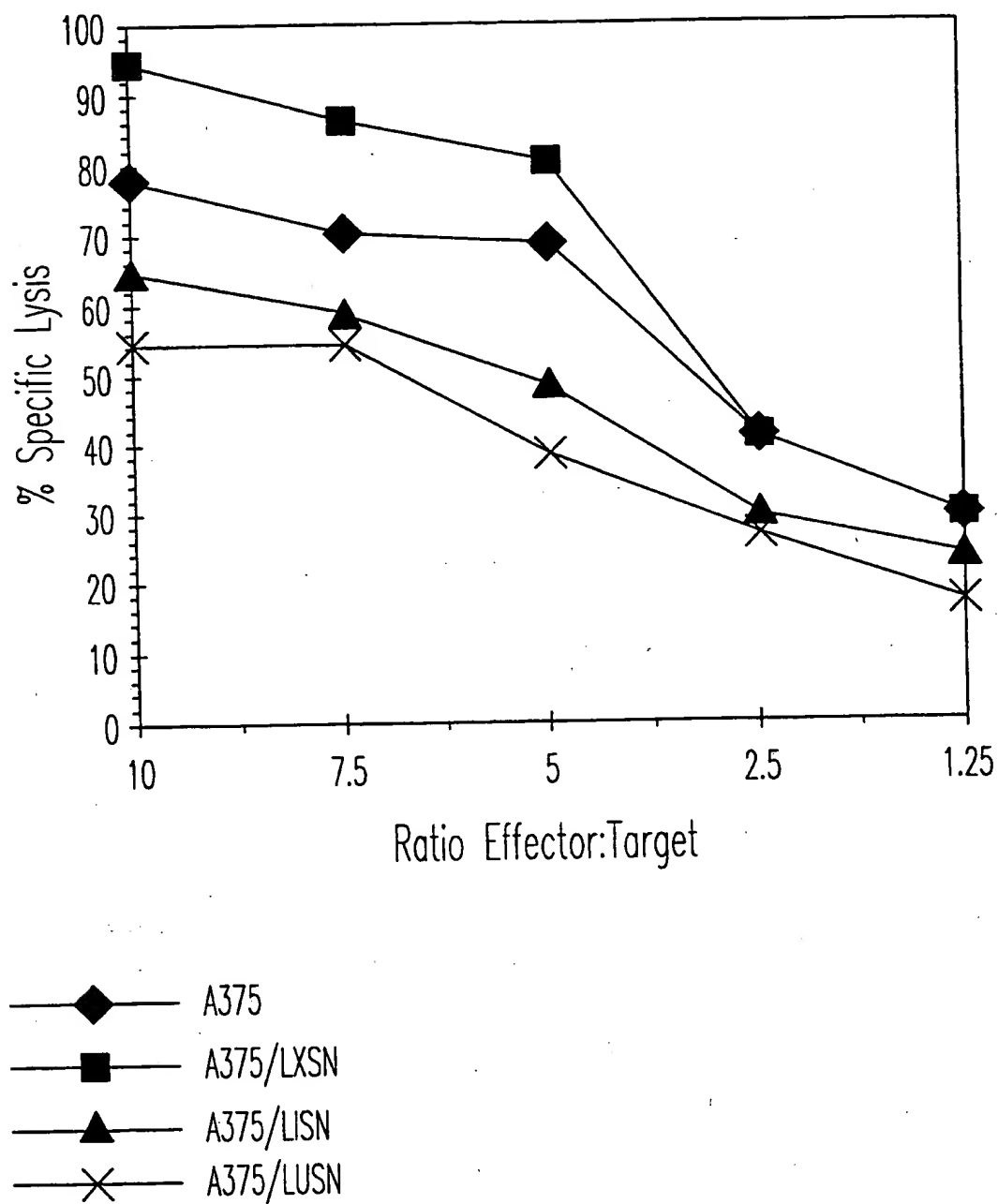
5/85

*Fig. 6A**Fig. 6B*

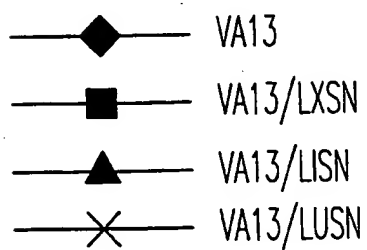
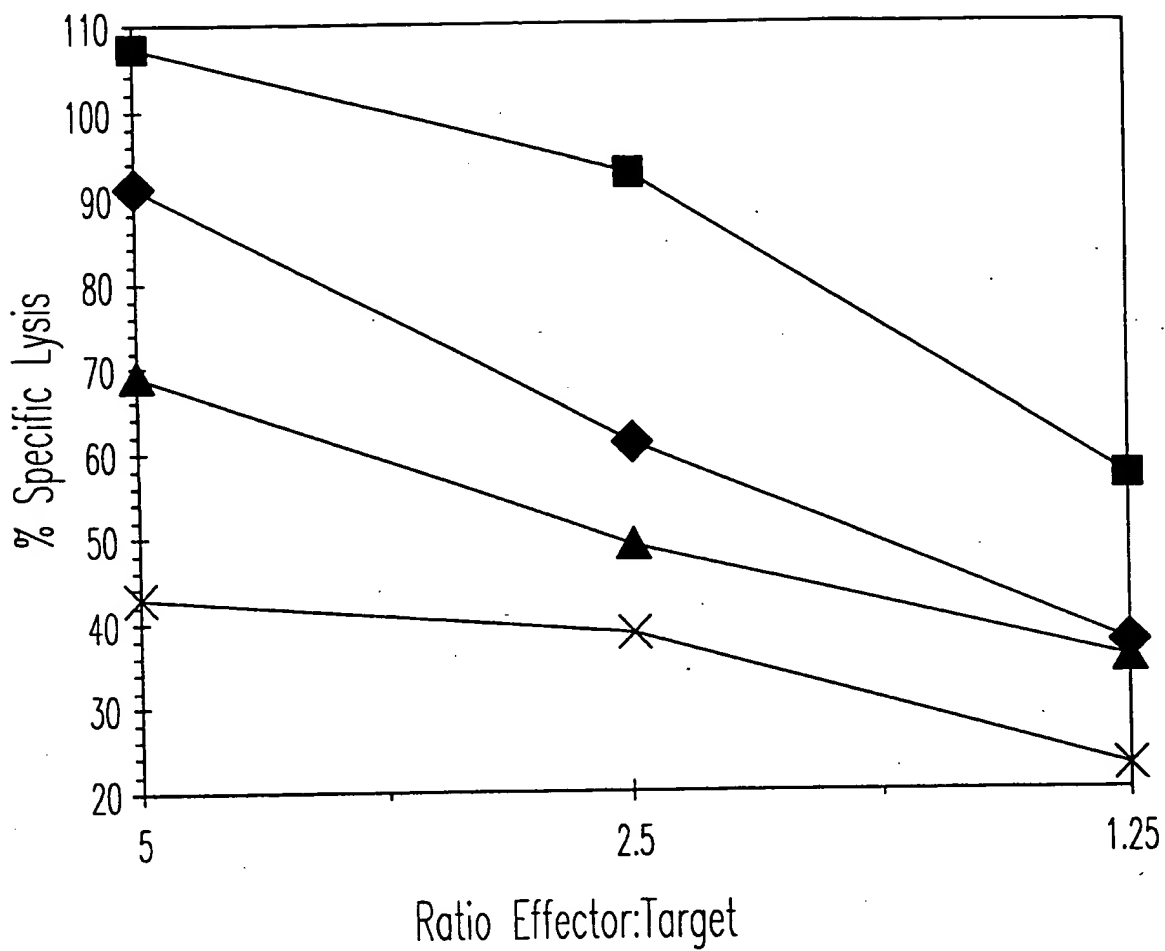
*Fig. 6C**Fig. 6D*

*Fig. 6E**Fig. 6F*

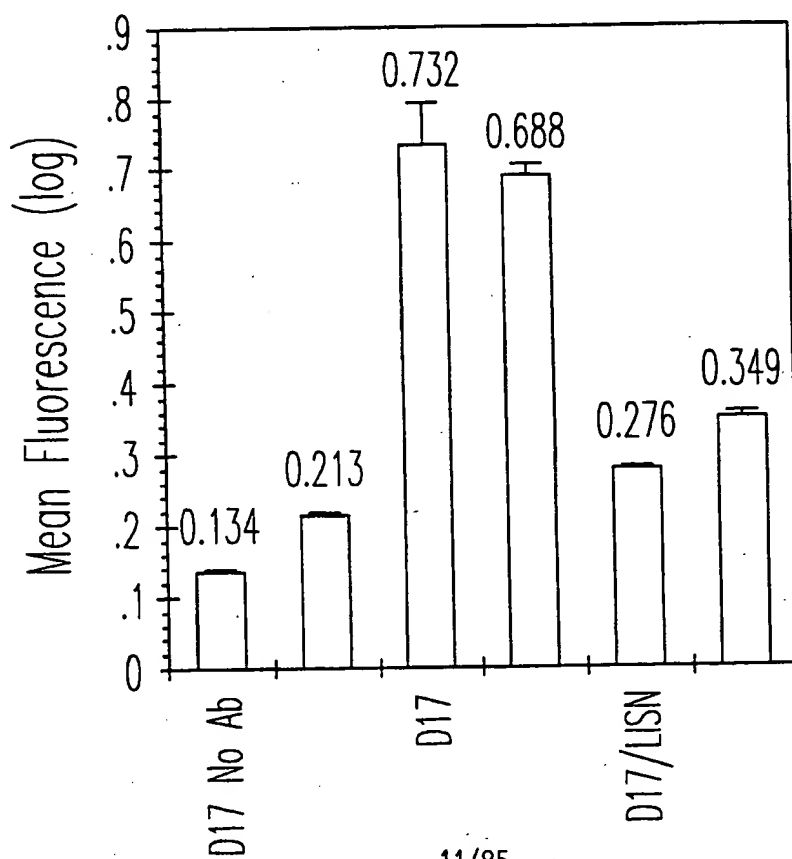
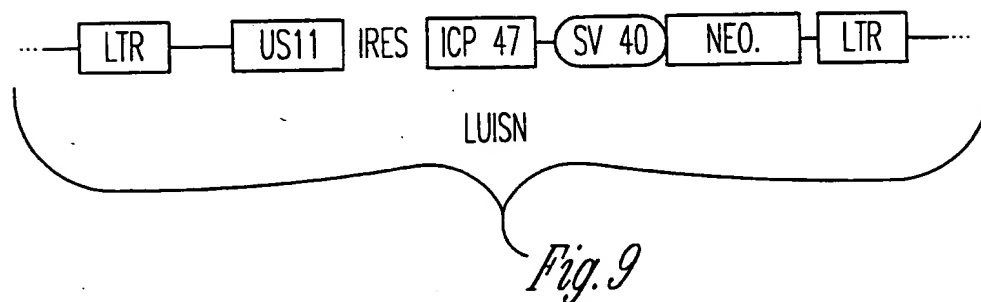
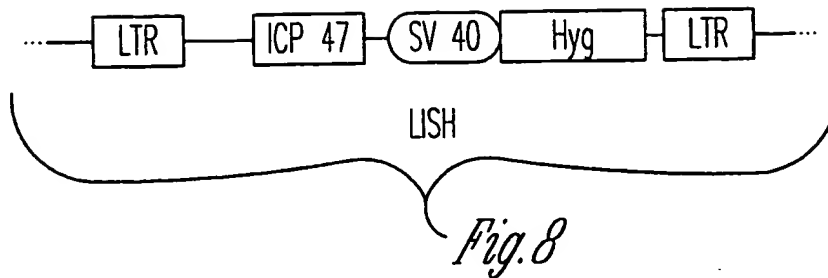


*Fig. 7A*

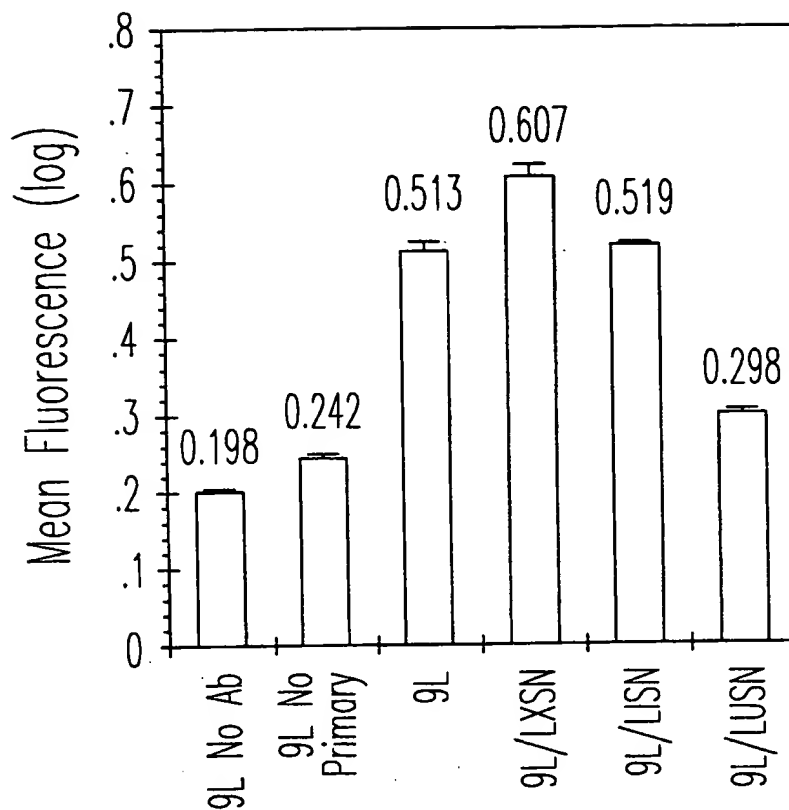
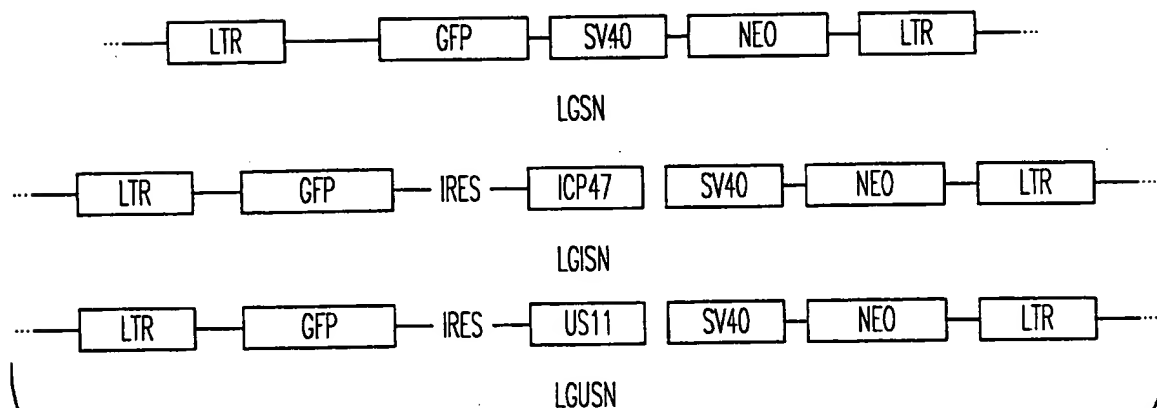
9/85

*Fig. 7B*

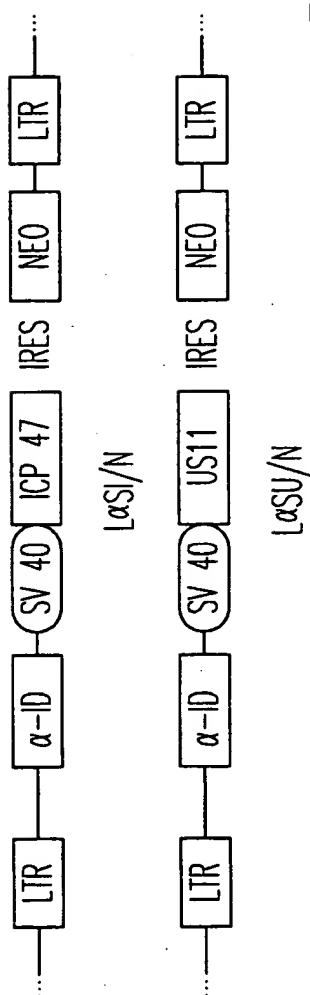
10/85

*Fig. 10A*

11/85

*Fig. 10B**Fig. 11*

12/85



*Fig. 12*

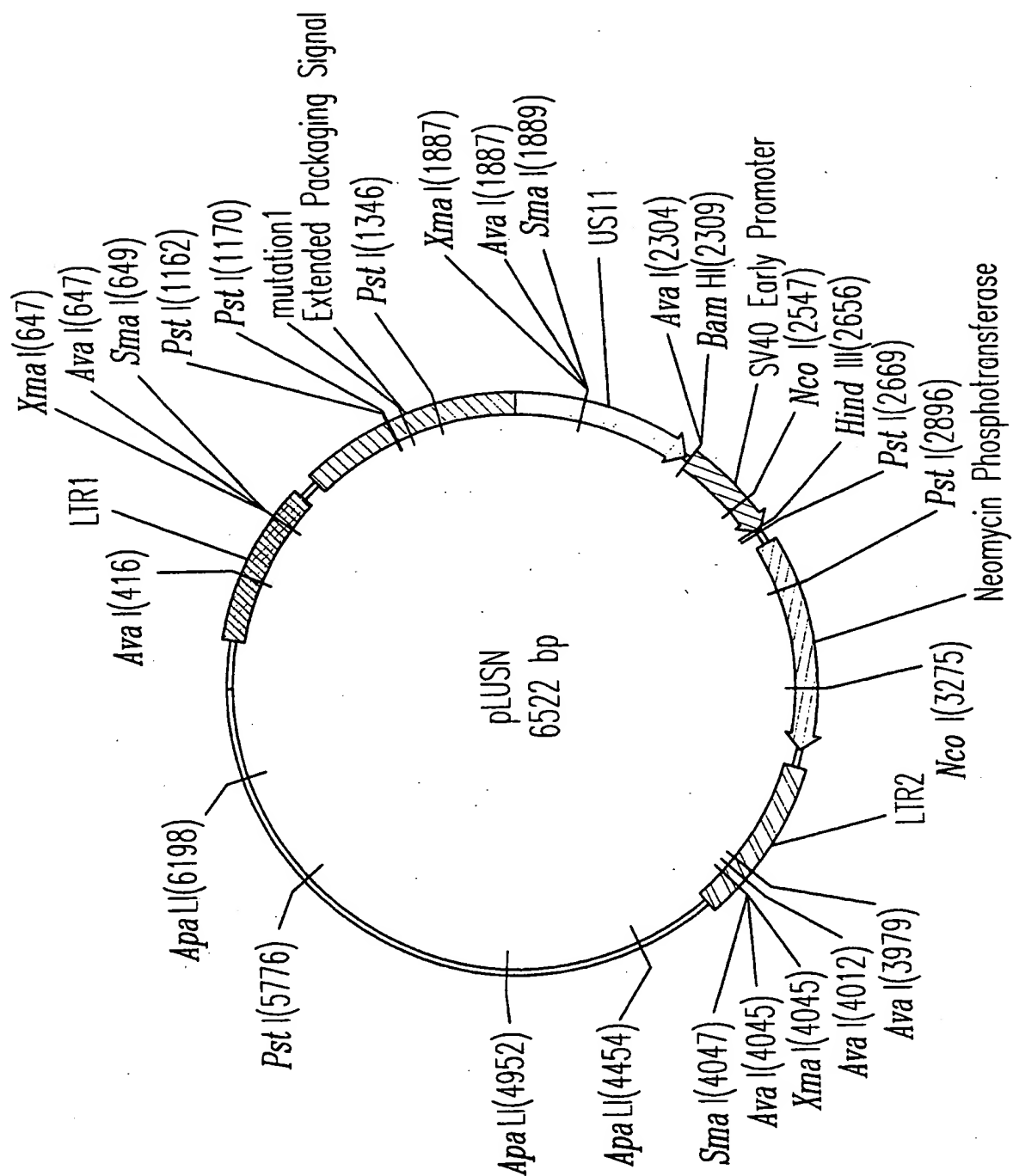


Fig. 13

```

1  GAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG
   CTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC
-----
51  AAAACTGTCC TCCAAATGTG TCCCCCTCAC ACTCCCAAAT TCGCGGGCTT
   TTTTGACAGG AGGTTTACAC AGGGGAGTG TGAGGGTTTA AGCGCCCGAA
-----
101 CTGCCTCTTA GACCACTCTA CCTATTCCC CACACTCACC GGAGCCAAAG
   GACGGAGAAT CTGGTGAGAT GGGATAAGG GTGTGAGTGG CCTCGGTTTC
-----
151 CCGCGGCCCT TCCGTTTCTT TGCTTTTGAA AGACCCACC CGTAGGTGGC
   GCGCGCGGGA AGGCAAAGAA ACGAAACTT TCTGGGGTGG GCATCCACCG
-----
201 AAGCTAGCTT AAGTAACGCC ACTTIGCAAG GCATGGAAAT ATACATAACT
   TTCGATCGAA TTCATTGCGG TGAACGTTT CGTACCTTTT TATGTATTGA
-----
251 GAGAAATAGAA AAGTTCAGAT CAAGTTCAGG AACAAAGAAA CAGCTGAATA
   CTCCTTATCTT TTCAAGTCTA GTTCCAGTCC TTGTTTCTTT GTCGACTTAT
-----
301 CCAACACAGGA TATCTGTGGT AAGCGTTCC TGCCCCGGCT CAGGGCCAAG
   GGTTCGTCCT ATAGACACCA TTCGCCAAGG ACGGGCCGGA GTCCCGGTTT
-----
351 AACAGATGAG ACAGCTGAGT GATGGCCAA ACAGGATATC TGTGGTAAGC
   TTGTCTACTC TGTCGACTCA CTACCCGGTT TGTCCTATAG ACACCATTCG
-----
-----
Aval
-----
401 AGTTCCTGCC CCGGCTCGGG GCCAAGAACA GATGGTCCCC AGATGCGGTC
   TCAAGGACGG GCGCGAGCCC CGGTTCTTGT CTACGAGGGG TCTACGCCAG

```

Fig. 14-1

```

451 CAGCCCTCAG CAGTTTCTAG TGAATCATCA GATGTTTCCA GGGTGCCCCA
    GTCGGGAGTC GTCAAAGATC ACTTAGTAGT CTACAAAGGT CCCACGGGGT
-----
501 AGGACCTGAA AATGACCCTG TACCTTAATT GAACTAACCA ATCAGTTTCG
    TCCTGGACTT TTA CTGGGAC ATGGAATAAA CTTGATTGGT TAGTCAAGCG
-----
551 TTCTCGCTTC TGTTCCGCGG CTTCGGCTCT CCGAGCTCAA TAAAGAGCC
    AAGAGCGAAG ACAAGCGCGC GAAGGCGAGA GGCTCGAGTT ATTTTCTCGG
-----
                                     XmaI
                                     ~~~~
                                     SmaI
                                     ~~~~
                                     Aval
                                     ~~~~
601 CACAACCCCT CACTCGGCGC GCCAGTCTTC CGATAGACTG CGTCGCCCGG
    GTGTTGGGGA GTGAGCCCGC CGGTCAGAA GCTATCTGAC GCAGCGGGCC
-----
                                     XmaI
                                     ~
                                     SmaI
                                     ~
                                     Aval
                                     ~
651 GTACCCGTAT TCCCAATAAA GCCTCTTGCT GTTGCATCC GAATCGTGGT
    CATGGGCATA AGGTTTATTT CGGAGAACGA CAAACGTAGG CTTAGCACCA
-----
701 CTCGCTGTTT CTGCGGAGGG TCTCCTCTGA GTGATTGACT ACCCAGGACG
    GAGCGACAAG GAACCTCTCC AGAGGAGACT CACTAACTGA TGGGTGCTGC
-----

```

Fig. 14-2



```

751  GGGGTCTTTC ATTTGGGGG TCGTCCGGGA TTTGGAGACC CCTGCCCAGG
      CCCAGAAAG TAAACCCCG AGCAGGCCCT AACCTCTGG GGACGGGTCC
-----
801  GACCACCGAC CCACCACCG GAGGTAAGCT GGCCAGCAAC TTATCTGTGT
      CTGGTGGCTG GGTGGTGGCC CTCATTCTGA CCGGTCGTTG AATAGACACA
-----
851  CTGTCCGATT GTCTAGTGTG TATGTTTGAT GTTATGCGCC TGCCTCTGTA
      GACAGGCTAA CAGATCACAG ATACAAACTA CAATACGCGG ACGCAGACAT
-----
901  CTAGTTAGCT AACTAGTCTT GTATCTGGCG GACCCGTGGT GGAACGTACG
      GATCAATCGA TTGATCGAGA CATAGACCGC CTGGGCACCA CCTTGACTGC
-----
951  AGTCTGAAC ACCCGGCCG GTATCTGGGA GACGTCCCAG GGACTTTGGG
      TCAAGACTTG TGGCCGGCG TTGGGACCTT CTGCAGGGTC CCTGAAACCC
-----
1001 GGCCGTTTT GTGGCCCGAC CTGAGGAAGG GAGTCGATGT GGAATCCGAC
      CCGGCAAAA CACCGGGCTG GACTCCTTCC CTCAGCTACA CCTTAGGCTG
-----
1051 CCCGTCAGGA TATGTGGTTC TGGTAGGAGA CGAGAACCTA AAACAGTTCC
      GGCAGTCCT ATACACCAAG ACCATCCTCT GCTCTTGGAT TTTGTCAAGG
-----
1101 CGCCTCCGTC TGAATTTTG CTTTCGGTTT GGAACCGAAG CCGCGCGTCT
      GCGGAGGCAG ACTTAAAAAC GAAAGCCAAA CCTTGGCTTC GGCGCGCAGA
-----
      PstI      PstI
-----
1151 TGTCTGCTGC AGCGCTGCAG CATCGTTCTG TGTTGTCTCT GTCTGACTGT
      ACAGACGACG TCGCGACGTC GTAGCAAGAC ACAACAGAGA CAGACTGACA
-----

```

Fig. 14-3

1201 GTTTCIGTAT TTGTCTGAAA ATTAGGGCCA GACTGTTACC ACTCCCTTAA  
CAAAGACATA AACAGACTTT TAATCCCGGT CTGACAATGG TGAGGGAATT  
-----  
1251 GTTTGACCTT AGGTCACTGG AAAGATGTGC AGCGGATCGC TCACAACCAG  
CAAACCTGGAA TCCAGTGACC TTTCTACAGC TCGCCTAGCG AGTGTGGTC  
-----  
PstI  
-----  
1301 TCGGTAGATG TCAAGAAGAG ACGTTGGGT ACCTTCTGCT CTGCAGAATG  
AGCCATCTAC AGTTCTTCTC TGCAACCCAA TGGAAGACGA GACGTCTTAC  
-----  
1351 GCCAACCTTT AACGTGGAT GGCCGGGAGA CGCACCTTT AACCGAGACC  
CGGTTGGAAA TTGCAGCCTA CCGGCGTCT GCCGTGAAA TTGGCTCTGG  
-----  
1401 TCATCACCCA GGTTAAGATC AAGTCTTTT CACCTGGCCC GCATGGACAC  
AGTAGTGGGT CCAATTCTAG TTCCAGAAAA GTGGACCGGG CGTACCTGTG  
-----  
1451 CCAGACCAGG TCCCCTACAT CGTGACCTGG GAAGCCTTGG CTTTTGACCC  
GGTCTGGTCC AGGGGATGA GCACTGGACC CTTCGGAACC GAAAACTGGG  
-----  
1501 CCCTCCCTGG GTCAAGCCCT TTGTACACCC TAAGCCTCCG CCTCCTCTTC  
GGGAGGGACC CAGTTCGGGA AACATGTGGG ATTCGGAGGC GGAGGAGAAG  
-----  
1551 CTCCATCCGC CCGTCTCTC CCCCTTGAAC CTCCTCGTTC GACCCCGCCT  
GAGGTAGGCG GGGCAGAGAG GGGGAACCTG GAGGAGCAAG CTGGGCGGGA  
-----  
1601 CGATCCTCCC TTTATCCAGC CCTCACTCCT TCTCTAGGCG CCGGATGAAC  
GCTAGGAGGG AAATAGGTCTG GGAGTGAGGA AGATATCCGC GGCCTACTTG  
-----

Fig. 14-4

Fig. 14-5

1651 CTGTGTAATGC TTATTCTAGC CCTCTGGGCC CCGTCCGGG GTAGTATGCC  
GAACATTACG AATAAGATCG GGAGACCCGG GGCCAGCGCC CATCATACGG

1701 TGAATTATCC TTGACTCTTT TCGATGAACC TCCGCCCTTG GTGGAGACGG  
ACTTAATAGG AACTGAGAA AGCTACTTGG AGGCGGAAC CACCTCTGCC

1751 AGCCGTTACC GCCTCTGTCC GATGTTTCGG AGTACCGAGT AGAGTATTCC  
TCGGCAATGG CGGAGACAGG CTACAAAGCC TCATGGCTCA TCTCATAAGG

1801 GAGGCGGCT GCGTGCTCCG ATCGGGCGGT CGACTGGAGG CTCTGTGGAC  
CTCCGGCGGA CGCAGGAGC TAGCCCGCCA GTGACCTCC GAGACACCTG

XmaI

~~~~~

SmaI

~~~~~

AvaI

~~~~~

1851 CCTGCGCGGG AACCTGTCCG TGCCACAGCC GACACCCCGG GTGTACTACC  
GGACGCGCCC TTGGACAGGC ACGGTGCGG CTGTGGGGCC CACATGATGG

1901 AGACGCTGGA GGGCTACGG GATCGAGTGC CGACGCCCGT GGAGGACGTC  
TCTGCGACCT CCCGATGCGC CTAGCTCAG GCTGCGGCCA CCTCCTGCAG

1951 TCCGAAAGCC TCGTCGCAA ACGTACTGG CTCGGGACT ATCGTGTTC  
AGGCTTTCGG AGCAGCGTTT TCGGATGACC GAGGCCCTGA TAGCACAAGG

2001 CCAACGCACA AAACCTCGTGT TGTCTACTT TTCCCCCTGC CACCAATGCC  
GGTTGCGTGT TTTGAGCACA ACAAGATGAA AAGGGGACG GTGGTTACGG

2051 AAACCTTATTA TGTAGAGTGC GAACCCCGGT GCCTCGTGCC TTGGGTTCCC  
TTTGAATAAT ACATCTCAGG CTTGGGGCCA CGGAGCACGG AACCCAAGGG  
-----  
2101 CTGTGGAGCT CGTTAGAGGA CATCGAACGA CTATTGTTCC AGATCGCCG  
GACACCTCGA GCAATCTCCT GTAGCTTGCT GATAACAAGC TTCTAGCCGC  
-----  
2151 TCTAATGGCG TACTACGCGC TCACGATTAA GTCGGCGCAG TATACGCTGA  
AGATTACCGC ATGATGCGCG AGTGCTAATT CAGCCGCGTC ATATGCCGACT  
-----  
2201 TGATGGTGGC AGTGATTCAA GTGTTTGGG GGCIGTATGT GAAAGGTTGG  
ACTACCACCG TCACTAAGTT CACAAAACCC CCGACATACA CTTTCCAACC  
-----  
2251 CTGCACCGAC ATTTTCCCTG GATGTTTTCG GACCAGTGGT GAAATTCGTT  
GACGTGGCTG TAAAGGGAC CTACAAAAGC CTGGTCACCA CTTTAAGCAA  
-----  
-----  
BamHI  
-----  
Aval  
-----  
2301 AACTCGAGGA TCCGGCTGTG GAATGTGTGT CAGTTAGGGT GTGGAAGTC  
TTGAGCTCCT AGGCCGACAC CTTACACACA GTCAATCCCA CACCTTTCAG  
-----  
2351 CCCAGGCTCC CCAGCAGGCA GAAGTATGCA AAGCATGCAT CTCATTTAGT  
GGGTCCGAGG GGTCTGTCCT CTTTCATACGT TTCGTACGTA GAGTTAATCA  
-----  
2401 CAGCAACCAG GTGTGGAAAG TCCCCAGGCT CCCCAGCAGG CAGAAGTATG  
GTCGTTGGTC CACACCTTTC AGGGGTCCGA GGGGTCTGTC GTCTTCATAC  
-----

Fig. 14-6

2451 CAAAGCATGC ATCTCAATTA GTCAGCAACC ATAGTCCCGC CCCTAACTCC  
 GTTTCGTACG TAGAGTTAAT CAGTCGTTGG TATCAGGGCG GGGATTGAGG  
 -----  
 NcoI  
 ~~~~~  
 2501 GCCCATCCCG CCCTAATC CGCCAGTTC CGCCATTCT CGCCCCCATG  
 CGGTAGGGC GGGATTGAG GCGGTCAG GCGGTAAGA GCGGGGGTAC  
 -----  
 NcoI  
 ~~~~~  
 2551 GCTGACTAAT TTTTATTATT TATGAGAGG CCGAGGCCGC CTCGGCCTCT  
 CGACTGATTA AAAAAATAA ATACGCTCTC GGCTCCGGCG GAGCCGGAGA  
 -----  
 2601 GAGCTATCC AGAAGTAGTG AGGAGGCTTT TTTGGAGGCC TAGGCTTTTG  
 CTCGATAAGG TCTTCATCAC TCCTCCGAAA AAACCTCCG ATCCGAAAAAC  
 -----  
 HindIII PstI  
 ~~~~~  
 2651 CAAAAAGCTT GGGCTGCAGG TCGAGGCGGA TCTGATCAAG AGACAGGATG  
 GTTTTTCGAA CCCGACGTCC AGCTCCGCCT AGACTAGTTC TCTGTCTTAC  
 -----  
 2701 AGGATCGTTT CGCATGATTG AACAAAGATGG ATTGCACGCA GGTCTCCGG  
 TCCTAGCAAA GCGTACTAAC TTGTTCTACC TAACGTGCGT CCAAGAGGCC  
 -----  
 2751 CCGCTTGGGT GGAGAGGCTA TTCGGCTATG ACTGGGCACA ACAGACAATC  
 GGCGAACCCA CCTCTCCGAT AAGCCGATAC TGACCCGTGT TGCTGTGTAG  
 -----  
 2801 GGCTGTCTTG ATGCCGCCGT GTTCCGGCTG TCAGGCCAGG GGCGCCCGGT  
 CCGACGAGAC TACGGCGGCA CAAGGCCGAC AGTCGCGTCC CCGCGGGCCA  
 -----

Fig. 14-7

P811

2851 TCTTTTGTG AAGACCGACC TGTCGGGTGC CCTGAATGAA CTGCAGGACG  
AGAAAAACAG TTCTGGCTGG ACAGGCCACG GGACTTACTT GACGTCTCTGC  
-----  
2901 AGGCAGCGG GCTATCGTGG CTGGCCACGA CGGGCGTTCC TTGGCGCAGCT  
TCCGTCGCGC CGATAGCACC GACCGGTGCT GCCCGCAAGG AACGCGTCGA  
-----  
2951 GTGCTCGACG TTGTCACTGA AGCGGAAGG GACTGGGTGC TATTGGGCGA  
CACGAGCTGC AACAGTGACT TCGCCCTTCC CTGACCGACG ATAACCCGCT  
-----  
3001 AGTGCCGGG CAGGATCTCC TGTCACTCA CCTTGCTCCT GCCGAGAAAG  
TCACGGCCCC GTCCTAGAGG ACAGTAGAGT GGAACGAGGA CGGCTCTTTC  
-----  
3051 TATCCATCAT GGCTGATGCA ATGCGGCGG TGCATACGCT TGATCCGGCT  
ATAGGTAGTA CCGACTACGT TACGCCGCCG ACGTATGCGA ACTAGGCCGA  
-----  
3101 ACCTGCCCAT TCGACCCACCA AGCGAAACAT CGCATCGAGC GAGCACGTAC  
TGGACGGGTA AGCTGGTGGT TCGCTTTGTA GCGTAGCTCG CTCGTGCATG  
-----  
3151 TCGGATGGAA GCCGGTCTTG TCGATCAGGA TGATCTGGAC GAAGAGCATC  
AGCCTACCTT CGGCCAGAAC AGCTAGTCCT ACTAGACCTG CTTCTCGTAG  
-----  
3201 AGGGGCTCGC GCCAGCCGAA CTGTTCCGCA GGCTCAAGGC GCGCATGCCC  
TCCCGAGCG CGGTCGGCTT GACAAGCGGT CCGAGTTCCG CGCGTACGGG  
-----

22/85

SUBSTITUTE SHEET (RULE 26)

Fig. 14-8

## NcoI

```

3251 GACGGCGAGG ATCTCGTCGT GACCCATGGC GATGCCTGCT TGCCGAATAT
      CTGCCGCTCC TAGAGCAGCA CTGGGTACCG CTACGGACGA ACGGCTTATA
-----
3301 CATGGTGGAA AATGGCCGCT TTTCTGGATT CATCGACTGT GGCCGGCTGG
      GTACCACTT TTACCGGCGA AAAGACCTAA GTAGCTGACA CCGGCCGACC
-----
3351 GTGTGGCGGA CCGTATCAG GACATAGCGT TGGCTACCCG TGATATTGCT
      CACACCGCCT GCGGATAGTC CTGTATCGCA ACCGATGGC ACTATAACGA
-----
3401 GAAGAGCTTG GCGCGAATG GGCTGACCGC TTCCTCGTGC TTACCGGTAT
      CTTCCTCGAAC CGCGCTTAC CCGACTGGCG AAGGAGCAG AAATGCCATA
-----
3451 CGCCGCTCCC GATTCGCAGC GCATCGCCTT CTATCGCCTT CTGACGAGT
      GCGGCGAGGG CTAAGCGTCG CGTAGCGGAA GATAGCGGAA GAACTGCTCA
-----
3501 TCTTCTGAGC GGGACTCTGG GGTTGATAA AATAAAGAT TTATTTTAGT
      AGAAGACTCG CCTGAGACC CCAAGCTATT TTATTTTCTA AAATAAATCA
-----
3551 CTCAGAAAA AGGGGGGAAAT GAAAGACCC ACCTGTAGGT TTGGCAAGCT
      GAGGTCTTTT TCCCCCTTA CTTTCTGGG TGGACATCCA AACCCTTCCA
-----
3601 AGCTTAAGTA ACGCCATTTT GCAAGGCAATG GAAAAATACA TAACTGAGAA
      TCGAATTTCAT TGCGGTAAAA CGTTCCGTAC CTTTTTATGT ATTGACTCTT
-----
3651 TAGAGAAAGTT CAGATCAAGG TCAGGAACAG ATGGAACAGC TGAATATGGG
      ATCTCTTCAA GTCTAGTTCC AGTCCCTGTC TACCTTGTCG ACTTATACCC
-----

```

Fig. 14-9

```

3701 CCAAACAGGA TATCTGTGGT AAGCAGTTCC TGCCCCGGCT CAGGGCCAAG
      GGTTTGTCCT ATAGACACCA TTCGTCAAGG ACGGGGCCGA GTCCCCGGTTC
-----
3751 AACAGATGGA ACAGCTGAAT ATGGGCCAAA CAGGATATCT GTGGTAAGCA
      TTGTCCTACCT TGTCGACTTA TACCCGGTTT GTCCTATAGA CACCATTCGT
-----
3801 GTTCCTGCCC CGGCTCAGGG CCAAGAACAG ATGTCGCCCA GATGCGGTCC
      CAAGGACGGG GCCGAGTCCC GGTTCCTGTC TACCAGGGGT CTACGCCAGG
-----
3851 AGCCCTCAGC AGTTTCTAGA GAACCATCAG ATGTTTCCAG GGTGCCCCAA
      TCGGGAGTCG TCAAAGATCT CTGGTAGTC TACAAAGGTC CCACGGGGTT
-----
3901 GGACCTGAAA TGACCCCTGTG CCTTATTGA ACTAACCAAT CAGTTCGCTT
      CCTGGACTTT ACTGGGACAC GGAATAAACT TGATTGGTTA GTCAAGCGAA
-----
                                     Aval
                                     ~~~~~
3951 CTCGCTTCTG TTCGCGGGCT TCTGCTCCC GAGCTCAATA AAAGAGCCCA
      GAGCGAAGAC AAGCGCGCGA AGACGAGGGG CTCGAGTTAT TTTCTCGGGT
-----
                                     XmaI
                                     ~~~~~
                                     SmaI
                                     ~~~~~
                                     Aval
                                     ~~~~~
4001 CAACCCCTCA CTCGGGGCGC CAGTCCTCCG ATTGACTGAG TCGCCCCGGT
      GTTGGGGAGT GAGCCCCCGG GTCAGGAGGC TAACTGACTC AGCGGGCCCA
-----

```

Fig. 14-10

24/85



4051 ACCCGTGTAT CCAATAAACC CTCTTGAGT TGCATCCGAC TTGTGGTCTC  
TGGGCACATA GGTATTGG GAGAACGTCA ACGTAGGCTG AACACCAGAG  
-----  
4101 GCTGTTCCCT GGGAGGGTCT CCTCTGAGT ATTGACTACC CGTCAGCGGG  
CGACAAGGAA CCTCTCCAGA GGAGACTCAC TAACTGATGG GCAGTCGCCC  
-----  
4151 GGTCCTTCAT TTGGGGGCTC GTCCGGGATC GGGAGACCCC TGCCCCAGGA  
CCAGAAAGTA AACCCCGAG CAGGCCCTAG CCTCTGCGG ACGGTCCCT  
-----  
4201 CCACCGACCC ACCACCGGA GGTAAAGCTGG CTGCCCTCGG CGTTTCGGTG  
GGTGGCTGGG TGGTGGCCCT CCATTGACC GACGGAGCGC GCAAAGCCAC  
-----  
4251 ATGACGGTGA AACCTCTGA CACATGCAGC TCCGGAGAC GGTACAGCT  
TACTGCCACT TTTGGAGACT GTGTACGTCG AGGCCCTCTG CCAGTGTGA  
-----  
4301 TGTCTGTAAG CGGATGCCGG GAGCAGACAA GCCCGTCAGG GCGGTCAGC  
ACAGACATTC GCCTACGGCC CTCGTCTGTT CGGGCAGTCC CGCGCAGTCG  
-----  
4351 GGGTGTGGC GGGTGTGGG GCGCAGCCAT GACCCAGTCA CGTAGCGATA  
CCCACAACCG CCCACAGCCC CGCGTCGGTA CTGGGTCACT GCATCGCTAT  
-----  
4401 GCGGAGTGTA TACTGGCTTA ACTATGGGC ATCAGAGCAG ATTGTACTGA  
CGCCTCACAT ATGACCGAAT TGATACGCCG TAGTCTCGTC TAACATGACT  
-----  
-----  
4451 GAGTGCACCA TATGCGGTGT GAAATACCGC ACAGATGCGT AAGGAGAAAA  
CTCACGTGGT ATACGCCACA CTTTATGGCG TGCTACGCA TTCCTCTTTT  
-----

ApaLI

~~~~~

Fig. 14-11

4501 TACCGCATCA GCGGCTCTTC CGCTTCCTCG CTCCTGACT CGCTGCGCTC  
ATGGCGTAGT CCGCGAGAAG GCGAAGGAGC GAGTGACTGA GCGACGCGAG  
-----  
4551 GGTCGTTGG CTGCGGCGAG CCGTATCAGC TCACTCAAAG GCGGTAATAC  
CCAGCAAGCC GACGCCGCTC GCCATAGTCG AGTGAGTTTC CGCCATTATG  
-----  
4601 GGTATATCCAC AGAATCAGGG GATAACGCAG GAAAGAACAT GTGAGCAAAA  
CCAATAGGTG TCTTAGTCCC CTATTGCGTC CTTTCTTGTA CACTCGTTT  
-----  
4651 GGCCAGCAA AGGCCAGGAA CCGTAAAG GCGCGTTGC TGGCGTTT  
CCGGTCGTTT TCCGGTCCCTT GGCAATTTTC CCGCGCAACG ACCGCAAAA  
-----  
4701 CCATAGGCTC CGCCCCCTTG ACGAGCATCA CAAAATCGA CGCTCAAGTC  
GGTATCCGAG GCGGGGGGAC TGCTCGTAGT GTTTTAGCT GCGAGTTCAG  
-----  
4751 AGAGGTGGCG AAACCCGACA GGAATATAA GATACCAGGC GTTCCCCCT  
TCTCCACCGC TTGGGCTGT CCTGATATT CTATGGTCCG CAAAGGGGGA  
-----  
4801 GGAAGCTCCC TCGTGCGCTC TCCTGTTCCG ACCCTGCCG TTACCGGATA  
CCTTCGAGGG AGCACGCGAG AGGACAAGGC TGGGACGGCG AATGGCCTAT  
-----  
4851 CCTGTCCGCC TTTCCTCCCTT CCGGAAGCGT GGCGCTTCT CATAGCTCAC  
GGACAGGCGG AAAGAGGGAA GGCCTTCGCA CCGGAAAGA GTATCGAGTG  
-----  
4901 GCTGTAGGTA TCTCAGTTCC GTGTAGTCCG TTCGCTCCAA GCTGGGCTGT  
CGACATCCAT AGAGTCAAGC CACATCCAGC AAGCGAGGT CGACCCGACA  
-----

*Fig. 14-12*

ApalI  
~~~~~  
4951 GTGCACGAAC CCCCGTTCA GCCGACCGC TGCGCCTTAT CCGGTAACTA  
CACGTGCTTG GGGGGCAAGT CGGCTGGCG ACGCGAATA GGCCATTGAT  
-----  
5001 TCGTCTTGAG TCCAACCCGG TAAGACACGA CTTATCGCCA CTGGCAGCAG  
AGCAGAACTC AGGTGGGCC ATTCTGTGCT GAATAGCGGT GACCGTCGTC  
-----  
5051 CCACTGGTAA CAGGATTAGC AGAGGAGGT ATGTAGGCGG TGCTACAGAG  
GGTGACCATT GTCCTAATCG TCTCGCTCCA TACATCCGCC ACGATGTCTC  
-----  
5101 TTCTTGAAGT GGTGGCCTAA CTACGGCTAC ACTAGAAGGA CAGTATTGG  
AAGAACTTCA CCACCGGATT GATGCCGATG TGATCTTCCT GTCATAAACC  
-----  
5151 TATCTGCGCT CTGCTGAAGC CAGTTACCTT CGGAAAAAGA GTTGGTAGCT  
ATAGACGCGA GACGACTTCG GTCAATGGAA GCCTTTTTCT CAACCATCGA  
-----  
5201 CTTGATCCGG CAAACAAACC ACCGCTGTA GCGGTGGTTT TTTTGTGTGC  
GAACTAGGCC GTTTGTTTGG TGGCGACCAT CGCCACCATA AAAACAACG  
-----  
5251 AAGCAGCAGA TTACGCGCAG AAAAAAGGA TCTCAAGAAG ATCCTTTGAT  
TTCGTCGTCT AATGCGCGTC TTTTTTTCCT AGAGTCTTC TAGGAAACTA  
-----  
5301 CTTTCTACG GGGTCTGACG CTCAGTGGAA CGAAAACTCA CGTTAAGGGA  
GAAAAGATGC CCCAGACTGC GAGTCACCTT GCTTTGAGT GCAATTCCCT  
-----  
5351 TTTTGGTCAT GAGATTATCA AAAAGGATCT TCACCTAGAT CCTTTAAAT  
AAAACCAAGTA CTCTAATAGT TTTTCTCTAGA AGTGGATCTA GGAAAAATTA  
-----

*Fig. 14-13*

```

5401 TAAAAATGAA GTTTTAAATC AATCTAAAGT ATATATGAGT AAAC TTGGTC
      ATTTTACTT CAAAAATTAG TTAGATTCA TATATACTCA TTGGAACCCAG
-----
5451 TGACAGTTAC CAATGCTTAA TCAGTGAGGC ACCTATCTCA GCGATCTGTC
      ACTGTCAATG GTTACGAATT AGTCACTCCG TGGATAGAGT CGCTAGACAG
-----
5501 TATTTCTGTC ATCCATAGTT GCCTGACTCC CCGTCGTGTA GATAACTACG
      ATAAAGCAAG TAGGTATCAA CCGACTGAGG GGCAGCACAT CTATTGATGC
-----
5551 ATACGGGAGG GCTTACCATC TGGCCCCAGT GCTGCAATGA TACCGCGAGA
      TATGCCCTCC CGAATGGTAG ACCGGGTCA CGACGTTACT ATGGCGCTCT
-----
5601 CCCACGCTCA CCGGCTCCAG ATTTATCAGC AATAAACAG CCAGCCGGAA
      GGTGCGAGT GGCCGAGGTC TAAATAGTCG TTATTGGTC GGTCGGCCCTT
-----
5651 GGGCCGAGCG CAGAAGTGGT CCTGCAACTT TATCCGCCTC CATCCAGTCT
      CCCGGCTCGC GTCTTCACCA GGACGTTGAA ATAGGCGGAG GTAGGTCAGA
-----
5701 ATTAATTGTT GCCGGGAAGC TAGAGTAAGT AGTTCGCCAG TTAATAGTTT
      TAATTAAACA CGGCCCTTCG ATCTCATTCA TCAAGCGGTC AATTATCAAA
-----
                                     PstI
                                     ~~~~~
5751 GCGCAACGTT GTTGCCATTG CTGCAGGCAT CGTGGTGTCA CGTCGTCGT
      CGCGTTGCAA CAACGGTAAC GACGTCCGTA GCACCACAGT GCGAGCAGCA
-----
5801 TTGGTATGCG TTCAATCAGC TCCGGTTCCC AACGATCAAG GCGAGTTACA
      AACCATACCG AAGTAAGTCG AGGCCAAGGG TTGCTAGTTC CGCTCAATGT
-----

```

Fig. 14-14

```

5851  TGATCCCCCA  TGTGTGTCAG  AAAAGCGGTT  AGCTCCTTCG  GTCCTCCGAT  GTCCTCCGAT
      ACTAGGGGGT  ACAACACGTT  TTTTCGCCAA  TCGAGGAAGC  CAGGAGGCTA
-----
5901  CGTTGTCAGA  AGTAAGTTGG  CCGCAGTGT  ATCACTCATG  GTTATGGCAG  GTTATGGCAG
      GCAACAGTCT  TCATTCAACC  GCGGTCACAA  TAGTGAGTAC  CAATACCGTC
-----
5951  CACTGCATAA  TTCTCTTACT  GTCATGCCAT  CCGTAAGATG  CTTTCTCTGT  CTTTCTCTGT
      GTGACGTATT  AAGAGAAATG  CAGTACGGTA  GGCATTCTAC  GAAAAGACAC
-----
6001  ACTGGTGAGT  ACTCAACCAA  GTCATTCTGA  GAATAGTGTA  TCGGGCGACC  TCGGGCGACC
      TGACCACTCA  TGAGTTGGTT  CAGTAAGACT  CTTATCACAT  ACGCCGCTGG
-----
6051  GAGTTGCTCT  TGCCCGGGGT  CAACACGGGA  TAATACCGCG  CCACATAGCA  CCACATAGCA
      CTCAACGAGA  ACGGGCCGCA  GTTGTGCCCT  ATTATGGCGC  GGTGTATCGT
-----
6101  GAACTTTAAA  AGTGCTCATC  ATTGGAAAAC  GTTCTTCGGG  GCGAAAACTC  GCGAAAACTC
      CTTGAAATTT  TCACGAGTAG  TAACCTTTTG  CAAGAAGCCC  CGCTTTTGAG
-----
                                     ApaLI
                                     ~~~~
6151  TCAAGGATCT  TACCGCTGTT  GAGATCCAGT  TCGATGTAAC  CCACTCGTGC  CCACTCGTGC
      AGTTCCTAGA  ATGGCGACAA  CTCTAGGTCA  AGCTACATTG  GGTGAGCACG
-----
                                     ApaLI
                                     ~~~~
6201  ACCCAACTGA  TCTTCAGCAT  CTTTACTTTT  CACCAGCGTT  TCTGGGTGAG  TCTGGGTGAG
      TGGGTTGACT  AGAAGTCGTA  GAAAATGAAA  GTGGTCGCAA  AGACCCACTC
-----

```

Fig. 14-15

*Fig. 14-16*

6251 CAAAAACAGG AAGGCAAAAT GCCGCAAAA AGGAATAAG GCGACACCG  
GTTTTGTCC TTCCGTTTTA CGGCGTTTTT TCCCTTATTC CCGTGTGCC  
-----  
6301 AAATGTTGAA TACTCATACT CTTCCTTTTT CAATATTATT GAAGCATTTA  
TTTACAACTT ATGAGTATGA GAAGGAAAAA GTTATAATAA CTTCGTAAAT  
-----  
6351 TCAGGGTTAT TGTCTCATGA GCGGATACAT ATTGAATGT ATTAGAAAA  
AGTCCCAATA ACAGAGTACT CGCCTATGTA TAAACTTACA TAAATCTTT  
-----  
6401 ATAAACAAAT AGGGTTCCG CGCACATTTC CCCGAAAAGT GCCACCTGAC  
TATTTGTTA TCCCCAAGGC GCGTGTAAG GGGCTTTTCA CCGTGGACTG  
-----  
6451 GTCTAAGAAA CCATTATTAT CATGACATTA ACCTATAAAA ATAGGCGTAT  
CAGATTCTTT GGTAATAATA GTACTGTAAT TGGATATTTT TATCCGCATA  
-----  
6501 CACGAGGCC TTTGCTCTTC AA  
GTGCTCCGG AAAGCAGAAG TT  
-----

30/85

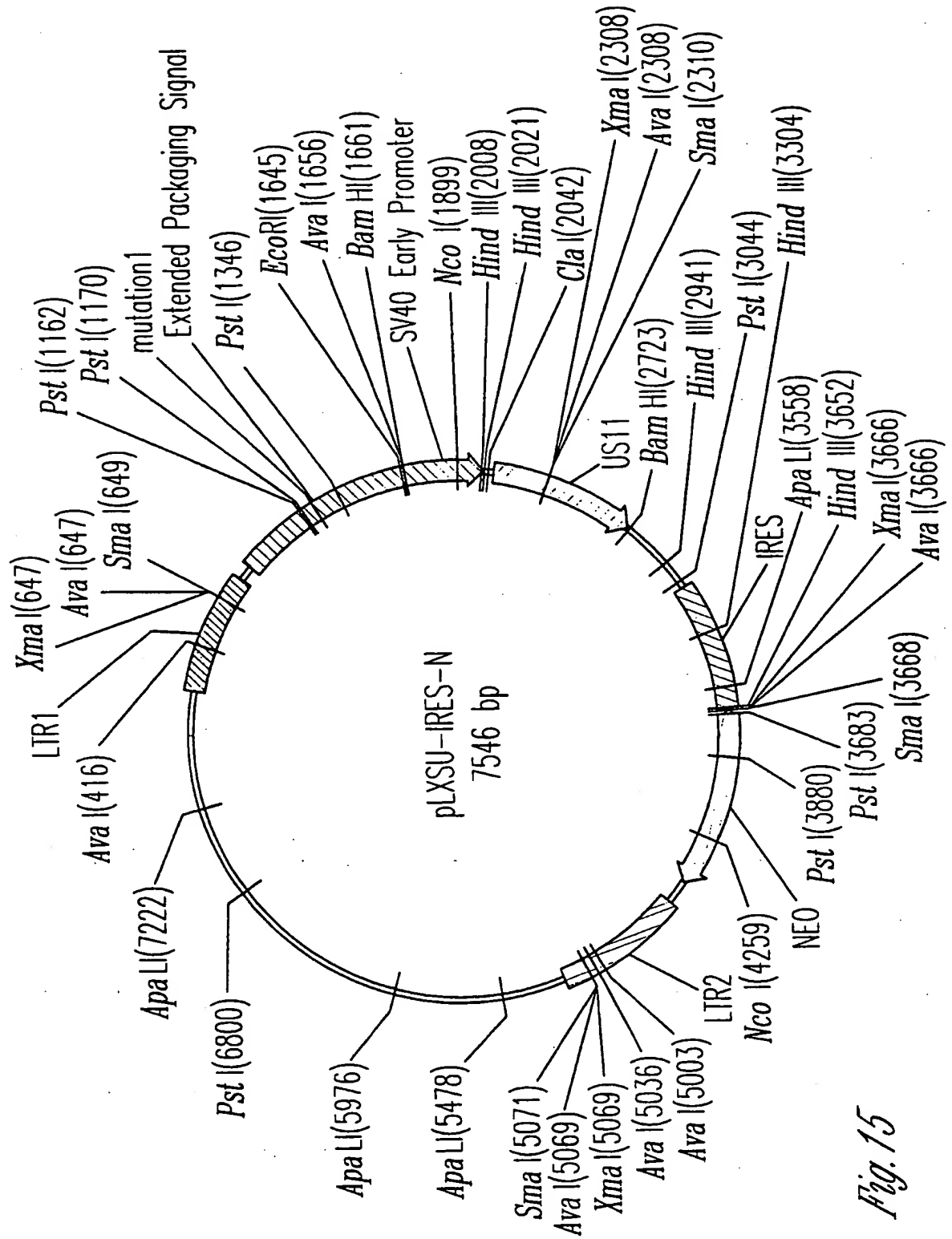


Fig. 15

1 GAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTGCTAG  
CTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC GTTAACGATC  
-----  
51 AAAACTGTCC TCCAAATGTG TCCCCTCTAC ACTCCCAAT TCGCGGGCTT  
TTTGTACAGG AGGTTTACAC AGGGGAGTG TGAGGGTTTA AGCGCCCGAA  
-----  
101 CTGCCCTCTTA GACCACTCTA CCTATTCCC CACACTCACC GGAGCCCAAAG  
GACGGAGAAT CTGGTGAGAT GGGATAAGG GTGTGAGTGG CCTCGGTTTC  
-----  
151 CCGCGGCCCT TCCGTTTCTT TGCTTTTGAA AGACCCACC CGTAGGTGGC  
GGCGCCGGA AGGCAAAGAA ACGAAACTT TCTGGGTGG GCATCCACCG  
-----  
201 AAGCTAGCTT AAGTAACGCC ACTTIGCAAG GCATGGAAA ATACATAACT  
TTCGATCGAA TTCATGCGG TGAACGTTT CGTACCTTTT TATGTAITGA  
-----  
251 GAGAATAGAA AAGTTCAGAT CAAGTCCAGG AACAAAGAA CAGCTGAATA  
CTCTTATCTT TTCAAAGTCTA GTTCCAGTCC TTGTTTCTTT GTCGACTTAT  
-----  
301 CCAAACAGGA TATCTGTGGT AAGCGTTCC TGCCCGGCT CAGGSCCAAG  
GGTTTGTCTT ATAGACACCA TTCCGCAAGG ACGGGCCGA GTCCCGGTTT  
-----  
351 AACAGATGAG ACAGCTGAGT GATGGGCCAA ACAGGATATC TGTGTAAGC  
TTGTCTACTC TGTCGACTCA CTACCCGGTT TGTCCTATAG ACACCATTCG  
-----  
Aval  
-----  
401 AGTTCCTGCC CCGGCTCGG GCCAAGAACA GATGTCCTCC AGATCGGTC  
TCAAGGACGG GGCCGAGCCC CGGTTCTTGT CTACCAGGG TCTACGCCAG  
-----

Fig. 16-1



```

451  CAGCCCTCAG CAGTTTCTAG TGAATCATCA GATGTTTCCA GGTGCCCCCA
      GTCGGGAGTC GTCAAAGATC ACTTAGTAGT CTACAAAGGT CCCACGGGGT
-----
501  AGGACCTGAA AATGACCCCTG TACCTTATTT GAACTAACCA ATCAGTTTCG
      TCCTGGACTT TTA CTGGGAC ATGGAATAAA CTTGATTGGT TAGTCAAGCG
-----
551  TTCTCGCTTC TGTTCGGCGG CTTCCGCTCT CCGAGCTCAA TAAAGAGACC
      AAGAGCGAAG ACAAGCGCGC GAAGGCGAGA GGCTCGAGTT ATTTTCTCGG
-----
                                     XmaI
                                     ~~~~~
                                     SmaI
                                     ~~~~~
                                     Aval
                                     ~~~~~
601  CACAACCCCT CACTCGGCGC GCCAGTCTTC CGATAGACTG CGTCGCCCGG
      GTGTTGGGGA GTGAGCCCGC CGGTCAAGAG GCTATCTGAC GCAGCGGGCC
-----
                                     XmaI
                                     ~
                                     SmaI
                                     ~
                                     Aval
                                     ~
651  GTACCCGTAT TCCCAATAAA GCCTCTTGCT GTTGCATCC GAATCGTGGT
      CATGGGCATA AGGTTTATTI CGGAGAACGA CAAACGTAGG CTTAGCACCA
-----
701  CTCGCTGTTT CTTGGGAGGG TCTCCTCTGA GTGATTGACT ACCCAGACG
      GAGCGACAAG GAACCTCTCC AGAGGAGACT CACTAACTGA TGGGTGCTGC
-----

```

Fig. 16-2

751 GGGGTCCTTC ATTTGGGGGC TCGTCCGGGA TTTGGAGACC CCTGCCCCAGG  
CCCCAGAAAG TAAACCCCCG AGCAGGCCCT AAACCTCTGG GGACGGGTCC  
-----  
801 GACCACCGAC CCACCACCGG GAGGTAAGCT GGCCAGCAAC TTATCTGTGT  
CTGGTGGCTG GGTGGTGGCC CTCCATTGGA CCGGTCGTTG AATAGACACA  
-----  
851 CTGTCCGATT GTCTAGTGC TATGTTTGAT GTTATGCGCC TGCCTCTGTA  
GACAGGCTAA CAGATCACAG ATACAACATA CAATACCGG ACGCAGACAT  
-----  
901 CTAGTTAGCT AACTAGCTCT GTATCTGGCG GACCCGTGGT GGAACGTACG  
GATCAATCGA TTGATCGAGA CATAGACCGC CTGGGCACCA CCTTGACTGC  
-----  
951 AGTTCTGAAC ACCGGCCGC AACCTTGGGA GACGTCCCAG GGACTTTGGG  
TCAAGACTTG TGGCCGGCG TTGGGACCT CTGCAGGGTC CCTGAAACCC  
-----  
1001 GGCCGTTTTT GTGCCCGAC CTGAGGAAGG GAGTCGATGT GGAATCCGAC  
CCGGCAAAA CACCGGGCTG GACTCCTTCC CTCAGCTACA CCTTAGGCTG  
-----  
1051 CCCGTCAGGA TATGTGTTTC TGGTAGGAGA CGAGAACCTA AAACAGTTCC  
GGGCAGTCCT ATACACCAAG ACCATCCTCT GCTCTTGGAT TTTGTCAAGG  
-----  
1101 CGCCTCCGTC TGAATTTTG CTTTCGGTTT GGAACCGAAG CCGCGCGTCT  
GCGGAGGCAG ACTTAAAAAC GAAAGCCAAA CCTTGGCTTC GGCGCGCAGA  
-----  
PstI PstI  
~~~~~  
1151 TGTCTGCTGC AGCGCTGCAG CATCGTTCTG TGTGTCTCT GTCTGACTGT  
ACAGACGACG TCGCGACGTC GTAGCAAGAC ACAACAGAGA CAGACTGACA  
-----

Fig. 16-3

1201 GTTCTGTAT TTGTCTGAAA ATTAGGGCCA GACTGTTACC ACTCCCTTAA  
CAAAGACATA AACAGACTTT TAATCCCGGT CTGACAATGG TGAGGGAATT  
-----  
1251 GTTIGACCTT AGGTCACCTG AAAGATGTCG AGCGGATCGC TCACAACCCAG  
CAAACTGGAA TCCAGTGACC TTCTCTACAGC TCGCCTAGCG AGTGTGGTC  
-----  
-----  
PstI  
-----  
1301 TCGGTAGATG TCAAGAAGAG ACGTTGGGTT ACCTTCTGCT CTGCAGAAATG  
AGCCATCTAC AGTTCTTCTC TGCAACCCAA TGGAGAGACGA GACGTCTTAC  
-----  
1351 GCCAACCTTT AACGTCGGAT GGCCGCGAGA CGGCACCTTT AACCGAGACC  
CGGTTGGAAA TTGCAGCCTA CCGGCGCTCT GCCGTGGAAA TTGGCTCTGG  
-----  
1401 TCATCACCCA GGTAAAGATC AAGGCTTTT CACCTGGCCC GCATGGACAC  
AGTAGTGGGT CCAATTCTAG TTCCAGAAAA GTGGACCGGG CGTACCTGTG  
-----  
1451 CCAGACCAGG TCCCCTACAT CGTGACCTGG GAAGCCTTGG CTTTGTGACCC  
GGTCTGGTCC AGGGGATGTA GCACTGGACC CTTCGGAACC GAAAACTGGG  
-----  
1501 CCTCCCTGG GTCAAGCCCT TTGTACACCC TAAGCCTCCG CCTCCTCTTC  
GGGAGGGACC CAGTTCGGGA AACATGTGG AITCGGAGGC GGAGGAGAAG  
-----  
1551 CTCCATCCGC CCGTCTCTC CCCCTTGAAC CTCCTCGTTC GACCCCGCCT  
GAGGTAGGCG GGCAGAGAG GGGGAACCTG GAGGAGCAAG CTGGGGCGGA  
-----

Fig. 16-4

1601 CGATCCTCCC TTATCCAGC CCTCACTCCT TCTCTAGGCG CCGGAATTCC  
 GCTAGGAGGG AATAGGTCTG GGAGTGAGGA AGAGATCCGC GGCCTTAAGC  
 -----  
 BamHI  
 -----  
 1651 TTAACCTCGAG GATCCGGCTG TGAATGTGT GTCAGTTAGG GTGTGGAAAG  
 AATTGAGCTC CTAGGCCGAC ACCTTACACA CAGTCAATCC CACACCTTTC  
 -----  
 1701 TCCCCAGGCT CCCCAGCAGG CAGAAGTATG CAAAGCATGC ATCTCAATTA  
 AGGGTCCGA GGGGTCGTCC GTCTTCATAC GTTTCGTACG TAGAGTTAAT  
 -----  
 1751 GTCAGCAACC AGGTGTGGAA AGTCCCCAGG CTCCCCAGCA GGCAGAAAGTA  
 CAGTCGTTGG TCCACACCTT TCAGGGGTCC GAGGGTCTGT CCGTCTTCAT  
 -----  
 1801 TGCAAAGCAT GCATCTCAAT TAGTCAGCAA CCATAGTCCC GCCCCTAACT  
 ACGTTTCGTA CGTAGAGTTA ATCAGTCGTT GGTATCAGGG CGGGGATTGA  
 -----  
 NcoI  
 -----  
 1851 CCGCCCATCC CGCCCCTAAC TCCGCCCAGT TCCGCCCATTT CTCCGCCCCA  
 GCGGGGTAGG GCGGGGATTG AGCGGGGTCA AGCGGGGTAA GAGCGGGGT  
 -----  
 NcoI  
 -----  
 1901 TGGCTGACTA ATTTTTTTTA TTTATGCAGA GGCCGAGGCC GCCTCGGCCT  
 ACCGACTGAT TAAAAAAAAT AAATACGTCT CCGGCTCCGG CGGAGCCGGA  
 -----

Fig. 16-5

```

1951 CTGAGCTATT CCAGAAAGTAG TGAGGAGGCT TTTTGGAGG CCTAGGCTTT
      GACTCGATAA GGTCCTTCATC ACTCCTCCGA AAAAACCTCC GGATCCGAAA
      -----
      HindIII      HindIII      ClaI
      -----
2001 TGCAAAAAGC TTGGGCTGCA AGCTTGGTAC CGAGCTCGGA TCGATATCTG
      ACGTTTTTCG AACCCGACGT TCGAACCATG GCTCGAGCCT AGCTATAGAC
      -----
2051 CGCCCGCGTC GACGGATGAA CCTTGTAAATG CTTATTCTAG CCCTCTGGGC
      GCCGGCGCAG CTGCCTACTT GGAACATTAC GAATAAGATC GGGAGACCCG
      -----
2101 CCCGGTCGCG GGTAGTATGC CTGAATTATC CTTGACTCTT TTCGATGAAC
      GGGCCAGCGC CCATCATACG GACTTAATAG GAACTGAGAA AAGCTACTTG
      -----
2151 CTCGCGCCCTT GGTGGAGACG GAGCCGTTAC CGCCTCTGTC CGATGTTTCG
      GAGGCGGGAA CCACCTCTGC CTCGGCAATG GCGGAGACAG GCTACAAAGC
      -----
2201 GAGTACCGAG TAGAGTATTC CGAGGCGCGC TGCCTGCTCC GATCGGGCGG
      CTCATGGCTC ATCTCATAAG GCTCCGCGCG ACGCACGAGG CTAGCCCCGC
      -----
2251 TCGACTGGAG GCTCTGTGGA CCCTGCGCGG GAACCTGTCC GTGCCACCGC
      AGCTGACCTC CGAGACACCT GGGACGCGCC CTTGGACAGG CACGGGTGCG
      -----

```

37/85

SUBSTITUTE SHEET (RULE 26)

*Fig. 16-6*

XmaI  
-----  
SmaI  
-----  
AvaI  
-----

```

2301 CGACACCCCG GGTGTACTAC CAGACGCTGG AGGGCTACGC GGATCGAGTG
      GCTGTGGGCG CCACATGATG GTCTGCGACC TCCCGATGCG CCTAGCTCAC
-----
2351 CCGACGCCCG TGGAGGACGT CTCCGAAAGC CTCGTCGCAA AACGCTACTG
      GGCTGCGGCC ACCTCCTGCA GAGGCTTTCG GAGCAGCGTT TTGCGATGAC
-----
2401 GCTCCGGGAC TATCGTGTTC CCCAACGCAC AAACTCGTG TTGTTCTACT
      CGAGGCCCTG ATAGCACAAAG GGGTTGCGTG TTTTGAGCAC AACAAAGATGA
-----
2451 TTTCCCCCTG CCACCAATGC CAAACTTATT ATGTAGAGTG CGAACCCCGG
      AAAGGGGGAC GGTGGTTACG GTTGAATAA TACATCTCAC GCTTGGGGCC
-----
2501 TGCCTCGTGC CTGGGGTTCC CCTGTGGAGC TCGTTAGAGG ACATCGAAGC
      ACGGAGCACG GAACCCCAAG GGACACCTCG AGCAATCTCC TGTAGCTTGC
-----
2551 ACTATTGTTC GAAGATCGCC GTCTAATGGC GTACTACGCG CTCACGATTA
      TGATAACAAG CTTCTAGCGG CAGATTACCG CATGATGCGC GAGTGCTAAT
-----
2601 AGTCGGCGCA GTATACGCTG ATGATGGTGG CAGTGATTCA AGTGTTTTGG
      TCAGCCGCGT CATATGCCAC TACTACCACC GTCACTAAGT TCACAAAACC
-----
2651 GGGCTGTATG TGAAAGGTTG GCTGCACCGA CATTTCCTTTC GGATGTTTTC
      CCCGACATAC ACTTCCCAAC CGACGTGGCT GTAAAAGGGA CCTACAAAAG
-----

```

*Fig. 16-7*

## BamHI

2701 GGACCAGTGG TGAAATTGAG TGGATCCACT AGTAACGGCC GCCAGTGTGC  
CCTGGTCACC ACTTTAAGTC ACCTAGGTGA TCATGCGCG CCGTCACACG

2751 TGGAAATTAAT TCGCTGTCTG CGAGGGCCGG CTGTTGGGT GAGTACTCCC  
ACCTTAATTA AGCGACAGAC GCTCCCGGCC GACAACCCCA CTCATGAGGG

2801 TCTCAAAAGC GGGCATGACT TCTGGGCTAA GATTGTGAGT TTCCAAAAAC  
AGAGTTTTCG CCCGTACTGA AGACGCGATT CTAACAGTCA AAGTTTTCG

2851 GAGGAGGATT TGATATTAC CTGGCCCGCG GTGATGCCCTT TGAGGGTGGC  
CTCCTCCTAA ACTATAAGTG GACCGGGCGC CACTACGGAA ACTCCACCG

## HindIII

2901 CGCGTCCATC TGGTCAGAAA AGACAATCTT TTGTGTGCA AGCTTGAGGT  
GCGCAGGTAG ACCAGTCTTT TCTGTAGAA AAACAACAGT TCGAACTCCA

2951 GTGGCAGGCT TGAGATCTGG CCATACACTT GAGTGACAAT GACATCCACT  
CACCCTCCGA ACTCTAGACC GGTATGTGAA CTCACTGTTA CTGTAGGTGA

## PstI

3001 TTGCCCTTCT CTCCACAGGT GTCCACTCCC AGGTCCAACT GCAGGTCGAT  
AACGGAAAGA GAGGTGTCCA CAGGTGAGGG TCCAGGTGA CGTCCAGCTA

39/85

SUBSTITUTE SHEET (RULE 26)

Fig. 16-8

3051 CGAGCATGCA TCTAGGGCGG CCAATTGCCC CCTCTCCCTC CCCCCCCCCT  
GCTCGTACGT AGATCCCGCC GGTAAAGCGG GGAGAGGGAG GGGGGGGGA  
-----  
3101 AACGTTACTG GCCGAAGCCG CTTGGAATAA GGCCGGTGTG TGT'TGTCTA  
TTGCAATGAC CGGCTTCGGC GAACCTTATT CCGGCCACAC ACAAACAGAT  
-----  
3151 TATGTGATTT TCCACCATAT TGCCGTCTTT TGGCAATGTG AGGCCCCGGA  
ATACACTAAA AGGTGGTATA ACGCAGAAA ACCGTTACAC TCCCGGGCCT  
-----  
3201 AACCTGGCCC TGTCTTCTTG ACGAGCATTC CTAGGGTCT TTCCCTCTCTC  
TTGGACCGGG ACAGAAGAAC TGCTCGTAAG GATCCCCAGA AAGGGGAGAG  
-----  
3251 GCCAAAGGAA TGCAAGTCT GTTGAATGTC GTGAAGGAAG CAGTTCCTCT  
CGGTTTCCTT ACGTTCAGAA CAACTTACAG CACTTCCTTC GTCAAGGAGA  
-----  
HindIII  
-----  
3301 GGAAGCTTCT TGAAGACAAA CAACGTCTGT AGCGACCCCTT TGCAGGCAGC  
CCTTCGAAGA ACTTCTGTTT GTTGCAGACA TCGCTGGGAA ACGTCCGTCTG  
-----  
3351 GGAACCCCCC ACCTGGCGAC AGGTGCCCTCT GCGGCCAAAA GCCACGTGTA  
CCTTGGGGG TGGACCGCTG TCCACGGAGA CGCCGGTTTT CGGTGCACAT  
-----  
3401 TAAGATACAC CTGCAAGGC GGCACAAACC CAGTGCCACG TTGTGAGTTG  
ATTCTATGTG GACGTTTCCG CCGTGTGGG GTACCGGTGC AACACTCAAC  
-----  
3451 GATAGTTGTG GAAAGAGTCA AATGGCTCTC CTCAAGCGTA GTCAACAAGG  
CTATCAACAC CTTTCTCAGT TTACCGAGAG GAGTTCGCAT CAGTTGTTCC  
-----

*Fig. 16-9*



```

3501  GGCTGAAGGA  TGCCCAGAAG  GTACCCCAAT  GTATGGGAAT  CTGATCTGGG
      CCGACTTCCT  ACGGTCCTC  CATGGGTAA  CATACCCTTA  GACTAGACCC
-----
      ApalI
      ~~~~~
3551  GCCTCGGTGC  ACATGCTTTA  CATGTGTTTA  GTCGAGGTTA  AAAAAGCTCT
      CGGAGCCACG  TGTACGAAAT  GTACACAAAT  CAGCTCCAAT  TTTTTCGAGA
-----
3601  AGGCCCCCGG  AACCACGGGG  ACGTGGTTT  CCTTGAATAA  ACACGATGAT
      TCCGGGGGGC  TTGGTGCCCC  TGCACCAAAA  GGAACCTTTT  TGTGCTACTA
-----
      XmaI
      ~~~~~
      SmaI
      ~~~~~
      Aval
      ~~~~~
      HindIII
      ~~~~~
      PstI
      ~~~~~
3651  AAGCTTGCCA  CAACCCCGGG  ATAAATCCTG  CAGCCAATAT  GGGATCGGCC
      TTCGAACGGT  GTTGGGGCCC  TATTAAGGAC  GTCGGTTATA  CCTAGCCCGG
-----
3701  ATTGAACAAG  ATGGATTGCA  CGCAGGTCT  CCGGCCGCTT  GGGTGGAGAG
      TAACTTGTTT  TACCTAACGT  GCGTCCAAGA  GGCCGGCGAA  CCCACCTCTC
-----
3751  GCTATTCCGC  TATGACTGGG  CACAACAGAC  AATCGGCTGC  TCIGATGCCG
      CGATAAGCCG  ATACTGACCC  GTGTGTCTG  TTAGCCGACG  AGACTACGGC
-----
3801  CCGTGTTCGG  GCTGTACAGG  CAGGGCGGCC  CGGTTCTTTT  TGTCAAGACC
      GGCACAAGGC  CGACAGTCGC  GTCCCCGGCG  GCCAAGAAAA  ACAGTCTGG
-----

```

Fig. 16-10

## Pst I

3851 GACCTGTCCG GTGCCCTGAA TGAAGTGCAG GACGAGGCAG CGCGGCTATC  
CTGGACAGGC CACGGGACTT ACTTGACGTC CTGCTCCGTC GCGCCGATAG  
-----  
3901 GTGGCTGGCC ACGACGGCGG TTCCTTGCGC AGCTGTGCTC GACGTTGTCA  
CACCGACCGG TGCTGCCCGC AAGGAACGCG TCGACACGAG CTGCAACAGT  
-----  
3951 CTGAAGCGGG AAGGACTGG CTGCTATTGG GCGAAGTGCC GGGGCAGGAT  
GACTTCGCCC TTCCCTGACC GACGATAACC CGCTTCACGG CCCCCTCCTA  
-----  
4001 CTCCTGTTCAT CTCACCTTGC TCCTGCCGAG AAAGTATCCA TCATGGCTGA  
GAGGACAGTA GAGTGGAAACG AGGACGGCTC TTTCATAGGT AGTACCGACT  
-----  
4051 TGCAATGCGG CGGCTGCATA CGCTTGATCC GGCTACCTGC CCATTGACCC  
ACGTTACGCC GCCGACGTAT GCGAAGTAGG CCGATGGACG GGTAAAGCTGG  
-----  
4101 ACCAAGCGAA ACATCGCATC GAGCGAGCAC GTACTCGGAT GGAAGCCGGT  
TGGTTGCTTT TGTAGCGTAG CTCGCTCGTG CATGAGCCTA CCTTCGGCCA  
-----  
4151 CTGTGCGATC AGGATGATCT GGACGAAGAG CATCAGGGC TCGCGCCAGC  
GAACAGCTAG TCCTACTAGA CCTGCTTCTC GTAGTCCCGG AGCGCGGTG  
-----  
4201 CGAACTGTTC GCCAGGCTCA AGGCGCGCAT GCCCGACGGC GAGGATCTCG  
GCTTGACAAG CGGTCCGAGT TCCGCGCGTA CGGGCTGCCG CTCCTAGAGC  
-----

42/85

SUBSTITUTE SHEET (RULE 26)

Fig. 16-11

## NcoI

```

4251 TCGTGACCCA TGGCGATGCC TGCTTGCCGA ATATCATGGT GGAAATGGC
      AGCACTGGGT ACGCTACGG ACGAACGGCT TATAGTACCA CCTTTTACCG
-----
4301 CGCTTTTCTG GATTTCATCGA CTGTGGCCGG CTGGGTGTGG CGGACCGCTA
      GCGAAAAGAC CTAAGTAGCT GACACCGGCC GACCCACACC GCCTGGCGAT
-----
4351 TCAGGACATA GCGTTGGCTA CCCGTGATAT TGCTGAAGAG CTTGGCGGCG
      AGTCCTGTAT CGCAACCGAT GGGCACTATA ACGACTTCTC GAACCGCCGC
-----
4401 AATGGGCTGA CCGCTTCTC GTGCTTTACG GTATCGCCGC TCCCATTTCG
      TTACCCCGACT GCGGAAGGAG CACGAAATGC CATAGCGGCG AGGCTAAGC
-----
4451 CAGCGCATCG CCTTCTATCG CCTTCTTGAC GAGTTCGTGT CGAGGCGGAT
      GTCGCGTAGC GGAAGATAGC GGAAGAACTG CTCGAAGACCA GCTCCGCCCTA
-----
4501 CTGATCAAGA GACAGGATGA GGATCGTTTC GCGCGGGAAT CTGGGGTTTCG
      GACTAGTTCT CTGTCTTACT CCTAGCAAAG CGCGCCCTGA GACCCCAAGC
-----
4551 ATAAAATAAA AGATTTTATT TAGTCTCCAG AAAAAGGGG GAATGAAAGA
      TATTTTATTT TCTAAAATAA ATCAGAGGTC TTTTCCCCC CTTACTTTCT
-----
4601 CCCACCTGT AGGTTTGGCA AGCTAGCTTA AGTAAAGCCA TTTTGCAAGG
      GGGGTGGACA TCCAAACCGT TCGATCGAAT TCATTGCGGT AAAACGTTCC
-----
4651 CATGGAAAAA TACATAACTG AGAATAGAGA AGTTCAGATC AAGGTCAGGA
      GTACCTTTTT ATGTAATTGAC TCTTATCTCT TCAAGTCTAG TTCCAGTCTC
-----
4701 ACAGATGGAA CAGCTGAATA TGGGCCAAAC AGGATATCTG TGGTAAGCAG
      TGCTACCTT GTCGACTTAT ACCCGGTTTG TCCTATAGAC ACCATTCTGC

```

43/85

SUBSTITUTE SHEET (RULE 26)

Fig. 16-12

```
4751 TTCCTGCCCC GGCTCAGGGC CAAGAACAGA TGGAACAGCT GAATATGGGC
    AAGGACGGGG CCGAGTCCCG GTTCTTGCTT ACCTTGTCGA CTTATACCCG
-----
4801 CAAACAGGAT ATCTGTGGTA AGCAGTTCCT GCCCGGCTC AGGGCCAAGA
    GTTGTGTCCTA TAGACACCAT TCGTCAAGGA CGGGGCCGAG TCCCGGTTCT
-----
4851 ACAGATGGTC CCCAGATGCG GTCCAGCCCT CAGCAGTTTC TAGAGAACCA
    TGTCTACCAG GGTCTACGC CAGGTCGGGA GTCGTCAAAG ATCTCTTGGT
-----
4901 TCAGATGTTT CCAGGGTGCC CCAAGGACCT GAAATGACCC TGTGCCTTAT
    AGTCTACAAA GGTCCACCGG GGTTCCTGGA CTTTACTGGG ACACGGAATA
-----
4951 TTGAACTAAC CAATCAGTTC GTTTCTCGCT TCTGTTCGCG CGCTTCTGCT
    AACTTGATTG GTTAGTCAAG CGAAGAGCGA AGACAAGCGC GCGAAGACGA
-----
                    AvaI                      AvaI
                    ~~~~~                      ~~~~~
5001 CCCCGAGCTC AATAAAAGAG CCCACAACCC CTCACTCGGG GCGCCAGTCC
    GGGGCTCGAG TTATTTCTC GGGTGTGGG GAGTGAGCCC CGCGGTCAGG
-----
                    XmaI
                    ~~~~~
                    SmaI
                    ~~~~~
                    AvaI
                    ~~~~~
5051 TCCGATTGAC TGAGTCGCCC GGGTACCCGT GTATCCAATA AACCTCTTG
    AGGCTAACTG ACTCAGCGGG CCCATGGGCA CATAGGTTAT TTGGGAGAAC
-----
```

5101 CAGTTGCATC CGACTTGTGG TCTCGTGT TCTTGGGAGG GTCTCCTCTG GTCTCCTCTG  
GTCAACGTAG GCTGAACACC AGAGCGACAA GGAACCTTCC CAGAGGAGAC  
-----  
5151 AGTGATTGAC TACCCGTCAG CGGGGTCTT TCATTGGGG GCTCGTCCGG  
TCACTAACTG ATGGGCAGTC GCCCCAGAA AGTAAACCCC CGAGCAGGCC  
-----  
5201 GATCGGGAGA CCCCTGCCA GGGACCACCG ACCCACCACC GGGAGGTAAG  
CTAGCCCTCT GGGACGGGT CCTTGGTGGC TGGTGGTGG CCTTCCATT  
-----  
5251 CTGGCTGCCT CGCGCGTTTC GGTGATGACG GTGAAACCT CTGACACATG  
GACCGACGGA GCGCGCAAG CCACTACTGC CACTTTTGA GACTGTGTAC  
-----  
5301 CAGCTCCCGG AGACGTCAC AGCTGTCTG TAAGCGGATG CCGGGAGCAG  
GTCGAGGGCC TCTGCCAGTG TCGAACAGAC ATTGCGCTAC GGCCCTCGTC  
-----  
5351 ACAAGCCCGT CAGGGCGCGT CAGCGGTGT TGGCGGTGT CCGGGCGCAG  
TGTTGGGCA GTCCCGGCA GTCCGCCACA ACCGCCACA GCCCGCGTC  
-----  
5401 CCATGACCCA GTCACGTAGC GATAGCGGAG TGTATACTGG CTTAACTATG  
GGTACTGGGT CAGTGCATCG CTATCGCTC ACATATGACC GAATTGATAC  
-----  
-----  
5451 CGGCATCAGA GCAGATTGTA CTGAGAGTGC ACCATATGCG GTGTGAAATA  
GCCGTAGTCT CGTCTAACAT GACTCTCAG TGGTATACGC CACACTTTAT  
-----  
5501 CCGCACAGAT GCGTAAGGAG AAAATACCGC ATCAGGCGCT CTTCCGCTTC  
GGCGTGTCTA CGCATTCCTC TTTTATGGCG TAGTCCGCGA GAAGGCGAAG  
-----

ApaLI  
~~~~~

5551 CTCGCTCACT GACTCGCTGC GCTCGGTCGT TCGGCTGCGG CGAGCGGTAT  
GAGCGAGTGA CTGAGCGACG CGAGCCAGCA AGCCGACGCC GCTCGCCATA  
-----  
5601 CAGCTCACTC AAAGGCGGTA ATACGGTTAT CCACAGAATC AGGGATAAAC  
GTCGAGTGAG TTTCGGCCAT TATGCCAATA GGTGTCITAG TCCCTATTG  
-----  
5651 GCAGGAAAGA ACATGTGAGC AAAAGGCCAG CAAAAGGCCA GGAACCGTAA  
CGTCCCTTCT TGTAACACTCG TTTTCCGGTC GTTTCCGGT CCTTGGCATT  
-----  
5701 AAAGGCCGCG TTGCTGGCGT TTTTCCATAG GCTCCGCCCC CCTGACGAGC  
TTTCCGGCGC AACGACCGCA AAAAGGTATC CGAGGCGGGG GGAATGCTCG  
-----  
5751 ATCACAAAAA TCGACGCTCA AGTCAGAGGT GGCAGAACCC GACAGGACTA  
TAGTGTTTT AGCTGCGAGT TCAGTCTCCA CCGCTTTGGG CTGTCTTGAT  
-----  
5801 TAAAGATACC AGGCGTTTCC CCCTGGAAGC TCCCTCGTGC GCTCTCCTGT  
ATTCTATGG TCCGCAAGG GGGACCTTCG AGGAGACACG CGAGAGGACA  
-----  
5851 TCCGACCCCTG CCGCTTACCG GATACCTGTC CGCCTTTCTC CCTTCGGGAA  
AGGCTGGGAC GCGGAATGGC CTATGGACAG GCGGAAAGAG GGAAGCCCTT  
-----  
5901 GCGTGGCGCT TTCTCATAGC TCACGCTGTA GGTATCTCAG TTCGGTGTAG  
CGCACCCGCA AAGAGTATCG AGTCCGACAT CCATAGAGTC AAGCCACATC  
-----  
-----  
ApalI  
-----  
5951 GTCGTTGCGT CCAAGCTGGG CTGTGTGCAC GAACCCCCCG TTCAGCCCGA  
CAGCAAGCGA GGTTCGACCC GACACACGTG CTGCGGGGC AAGTCGGGT  
-----

6001 CCGTGCGCC TTATCCGGA ACTATCGTCT TGAGTCCAAC CCGTAAGAC  
GGCGACGGG AATAGGCCAT TGATAGCAGA ACTCAGGTG GGCCATTCTG  
-----  
6051 ACGACTTATC GCCACTGGCA GCAGCCACTG GTAACAGGAT TAGCAGAGCG  
TGCTGAATAG CGGTGACCGT CGTCGGTGAC CATTGTCCCTA ATCGTCTCGC  
-----  
6101 AGGTATGTAG GCGGTGCTAC AGAGTTCCTG AAGTGGTGGC CTAACCTACGG  
TCCATACATC CGCCACGATG TCTCAAGAAC TTCACCACCG GATTGATGCC  
-----  
6151 CTACACTAGA AGGACAGTAT TTGGTATCTG CGCTCTGCTG AAGCCAGTTA  
GATGTGATCT TCCGTGTCATA AACCATAGAC GCGAGACGAC TTCGGTCAAT  
-----  
6201 CCTTCGGAAA AAGAGTTGGT AGCTCTTGAT CCGGCAACA AACCAACCGCT  
GGAAGCCTTT TTCTCAACCA TCGAGAACTA GGCCGTTTGT TTGGTGGCGA  
-----  
6251 GGTAGCGGTG GTTTTGTGT TTGCAAGCAG CAGATTACGC GCAGAAAAA  
CCATCGCCAC CAAAAAACA AACGTTCTGTC GTCTAATGCG CGTCTTTT  
-----  
6301 AGGATCTCAA GAAGATCCTT TGATCTTTTC TACGGGGTCT GACGCTCAGT  
TCCTAGAGTT CTTCTAGGAA ACTAGAAAAAG ATGCCCCAGA CTGCGAGTCA  
-----  
6351 GGAACGAAAA CTCACGTAA GGGATTTTGG TCATGAGATT ATCAAAAAAGG  
CCTTGCTTTT GAGTGCAATT CCTAAAAACC AGTACTCTAA TAGTTTTC  
-----  
6401 ATCTTCACCT AGATCCTTTT AAATTAATAA TGAAGTTTAA AATCAATCTA  
TAGAAGTGGA TCTAGGAAAA TTTAATTTTT ACTTCAAAAT TTAGTTAGAT  
-----

6451 AAGTATATAT GAGTAAACTT GGTCTGACAG TTACCAATGC TTAATCAGTG  
TTCATATATA CTCATTGAA CCAGACTGTC AATGGTTACG AATTAGTCAC  
-----  
6501 AGGCACCTAT CTCAGCGATC TGTCTATTTC GTTCATCCAT AGTTGCCTGA  
TCCGTGGATA GAGTCGCTAG ACAGATAAAG CAAGTAGGTA TCAACGGACT  
-----  
6551 CTCCCGTCG TGATAGTAAC TACGATACGG GAGGCTTAC CATCTGGCCC  
GAGGGGCAGC ACATCTATTG ATGCTATGCC CTCCCAGATG GTAGACCGGG  
-----  
6601 CAGTGCTGCA ATGATACCGC GAGACCCACG CTCACCGGCT CCAGATTAT  
GTCACGACGT TACTATGGCG CTCTGGGTGC GAGTGGCCGA GGTCTAAATA  
-----  
6651 CAGCAATAAA CCAGCCAGCC GGAAGGGCCG AGCGCAGAAG TGGTCCTGCA  
GTCGTTATTT GGTCGGTCCG CCTTCCCGGC TCGCGTCTTC ACCAGGACGT  
-----  
6701 ACTTTATCCG CCTCCATCCA GTCTATTAAAT TGTTGCCGGG AAGCTAGAGT  
TGAAATAGGC GGAGGTAGGT CAGATAAATA ACAACGGCCC TTCGATCTCA  
-----  
PstI  
-----  
6751 AAGTAGTTCC CCAGTTAATA GTTTGCGCAA CGTTGTTGCC ATTGCTGCAG  
TTCATCAAGC GGTCAATTAT CAAACGCGTT GCAACAACGG TAACGACGTC  
-----  
6801 GCATCGTGGT GTCACGCTCG TCGTTTGGTA TGGCTTCATT CAGCTCCGGT  
CGTAGCACCA CAGTGGGAGC AGCAAAACCAT ACCGAAGTAA GTCGAGGCCA  
-----  
6851 TCCCAACGAT CAAGGCGAGT TACATGATCC CCCATGTTGT GCAAAAAGC  
AGGGTTGCTA GTTCCGCTCA ATGTACTAGG GGTACAACA CGTTTTCG  
-----

48/85

SUBSTITUTE SHEET (RULE 26)

Fig. 16-17



```

6901  GGTAGCTCC TTCGGTCCTC CGATCGTTGT CAGAACTAAG TTGGCCGCAG
      CCAATCGAGG AAGCCAGGAG GCTATCATTG AACGGCGGTC
-----
6951  TGTATCACT CATGGTTATG GCAGCACTGC ATAATTCTCT TACTGTCTATG
      ACAATAGTGA GTACCAATAC CGTCGTGACG TATTAAGAGA ATGACAGTAC
-----
7001  CCATCCGTAA GATGCTTTTC TGTGACTGGT GAGTACTCAA CCAAGTCAAT
      GGTAGGCAAT CTACGAAAAG ACACCTGACCA CTCATGAGTT GGTTCAGTAA
-----
7051  CTGAGAAATAG TGTATGCGGC GACCGAGTTG CTCTTGCCCG GCGTCAACAC
      GACTCTTATC ACATACGCCG CTGGCTCAAC GAGAACGGGC CGCAGTTGTG
-----
7101  GGGATAATAC CGGCCACAT AGCAGAACTT TAAAGTGCT CATCATTTGA
      CCTATTATG GCGGGTGTA TCGTCTTGAA ATTTTCACGA GTAGTAACCT
-----
7151  AAACGTTCTT CGGGCGGAA ACTCTCAAGG ATCTTACCGC TGTTGAGATC
      TTTGCAAGAA GCCCGCTTT TGAGAGTTCC TAGAATGGCG ACAACTCTAG
-----
                                     ApaLI
                                     ~~~~~
7201  CAGTTCGATG TAACCCACTC GTGCACCCAA CTGATCTTCA GCATCTTTTA
      GTCAAGCTAC ATTGGGTGAG CACGTGGGTT GACTAGAAGT CGTAGAAAAT
-----
7251  CTTTCACCAAG CGTTTCTGGG TGAGCAAAA AAGTCCGCA
      GAAAGTGGTC GCAAAGACCC ACTCGTTTTT GTCCTTCCGT TTTACGGCGT
-----
7301  AAAAAGGGAA TAAGGGCGAC ACGGAAATGT TGAATACTCA TACTCTTCCT
      TTTTTCCTT ATTCCCGCTG TGCCTTTTACA ACTTATGAGT ATGAGAAGGA
-----

```

Fig. 16-18

*Fig. 16-19*

```
7351 TTTTCAATAT TATTGAAGCA TTTATCAGGG TTATTGTCTC ATGAGCGGAT
    AAAAGTTATA ATAACTTCGT AAATAGTCCC AATAACAGAG TACTCGCCTA
-----
7401 ACATATTTGA ATGTATTTAG AAAAAATAAC AATAGGGGT TCCGCGCACAC
    TGTATAAACT TACATAAATC TTTTATTG TTTATCCCCA AGGCGCGTGT
-----
7451 TTTCCCCGAA AAGTGCCACC TGACGTCTAA GAAACCATTA TTATCATGAC
    AAAGGGGCTT TTCACGGTGG ACTGCAGATT CTTTGGTAAT AATAGTACTG
-----
7501 ATTAACCTAT AAAAATAGGC GTATCACGAG GCCCTTTCGT CTTCAA
    TAATTGGATA TTTTATCCG CATAGTGCTC CGGGAAGCA GAAGTT
-----
```

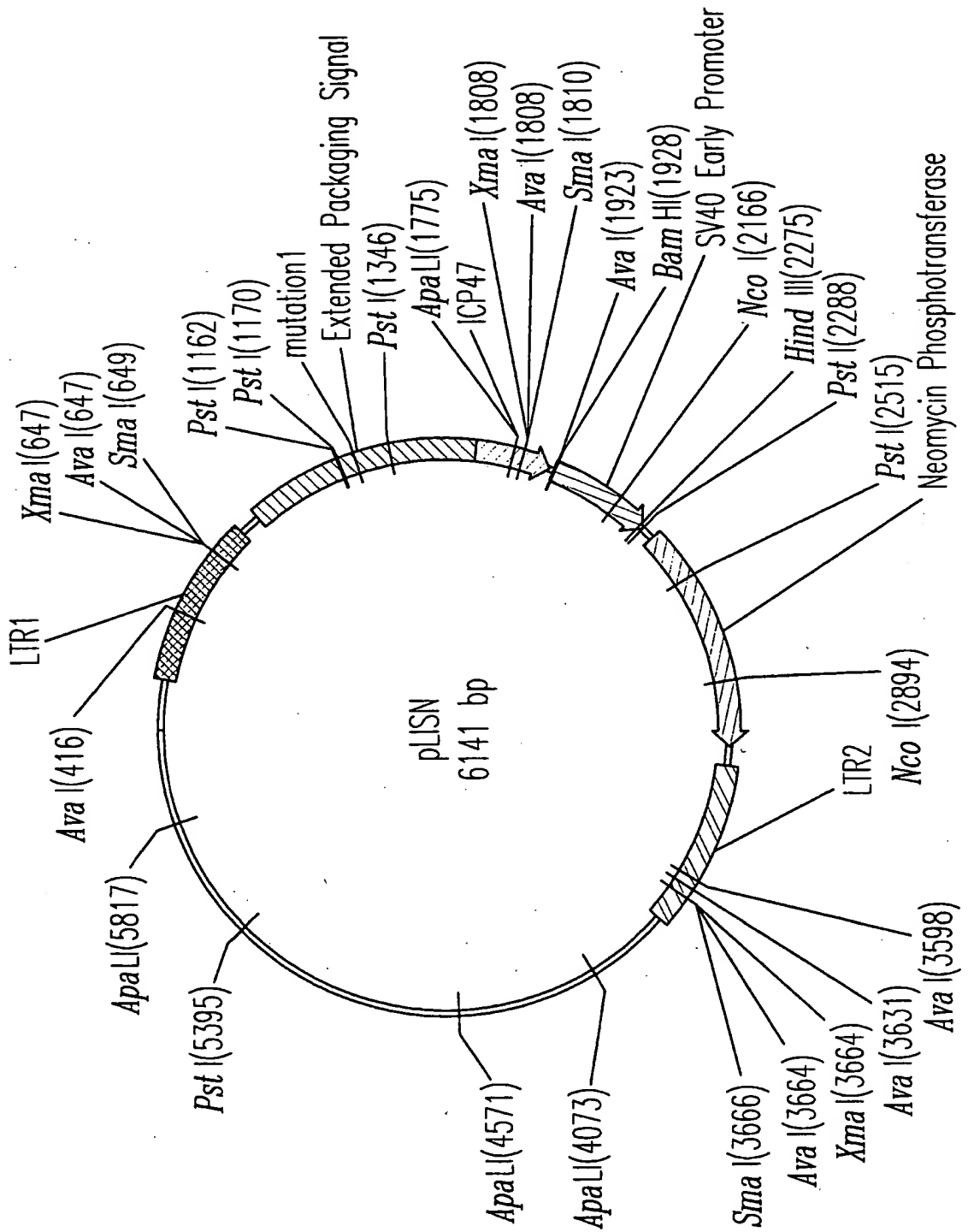


Fig. 17

1 GAATTGCTAG CAATTGCTAG CAATTCATAC CAGATCACCG  
CTTAACGATC GTTAACGATC GTTAACGATC GTTAAGTATG GTCTAGTGCG  
-----  
51 AAAACTGTCC TCCAAATGTG TCCCCCTCAC ACTCCCAAAT TCGCGGGCTT  
TTTGTACAGG AGGTTTACAC AGGGGGAGTG TGAGGGTTTA AGCGCCCGAA  
-----  
101 CTGCCCTCTTA GACCACTCTA CCTATTCCC CACACTCAC GGAGCCAAAG  
GACGGAGAAT CTGGTGAGAT GGGATAAGGG GTGTGAGTGG CCTCGGTTTC  
-----  
151 CCGCGGGCCCT TCCGTTTCTT TGCTTTTGAA AGACCCACCC CGTAGGTGGC  
GGCGCCGGGA AGGCAAAGAA ACGAAAACIT TCTGGGGTGG GCATCCACCG  
-----  
201 AAGCTAGCTT AAGTAACGCC ACTTTGCAAG GCATGGAAA ATACATAACT  
TTCGATCGAA TTCAATGCGG TGAACGTTT CGTACCTTTT TATGTATTGA  
-----  
251 GAGAATAGAA AAGTTCAGAT CAAGTTCAGG ACAAAGAAA CAGCTGAATA  
CTCTTATCTT TTCAAGTCTA GTTCCAGTCC TTGTTTCTTT GTCCGACTTAT  
-----  
301 CCAAACAGGA TATCTGTGGT AAGCGGTTCC TGCCCCGGCT CAGGGCCCAAG  
GGTTTGTCTT ATAGACACCA TTCGCCAAGG ACGGGGCCGA GTCCCCGGTTC  
-----  
351 AACAGATGAG ACAGCTGAGT GATGGGCCAA ACAGGATATC TGTGGTAAGC  
TTGTCTACTC TGTCGACTCA CTACCCGGTT TGTCCTATAG ACACCATTCG  
-----  
Aval  
~~~~~  
401 AGTTCCTGCC CCGGCTCGGG GCCAAGAACA GATGTCCCC AGATCGGTC  
TCAAGGACGG GGCCGAGCCC CGGTTCTTGT CTACCGAGGG TCTACGCCAG  
-----

*Fig. 18-1*

451 CAGCCCTCAG CAGTTTCTAG TGAATCATCA GATGTTTCCA GGGTGCCCCA  
GTGGGAGTC GTCAAGATC ACTTAGTAGT CTACAAAGGT CCCACGGGGT

501 AGGACCTGAA AATGACCCCTG TACCTTATTT GAACTAACCA ATCAGTTCGC  
TCCTGGACTT TTA CTGGGAC ATGGAATAA CTTGATTGGT TAGTCAAGCG

551 TTCTCGCTTC TGTTCGGCGG CTTCCGCTCT CCGAGCTCAA TAAAGAGGCC  
AAGAGCGAAG ACAAGCGCGC GAAGCGAGA GGCTCGAGTT ATTTTCTCGG

XmaI

~~~~~

SmaI

~~~~~

AvaI

~~~~~

601 CACAACCCCT CACTCGGCGC GCCAGTCTTC CGATAGACTG CGTCGCCCGG  
GTGTTGGGA GTGAGCCGCG CGGTCAGAAG GCTATCTGAC GCAGCGGGCC

XmaI

~~~~~

SmaI

~~~~~

AvaI

651 GTACCCGTAT TCCCAATAAA GCCTCTTGCT GTTGCATCC GAATCGTGGT  
CATGGGCATA AGGTTATTT CGGAGAACGA CAAACGTAGG CTTAGCACCA

701 CTCGCTGTTT CTGCGGAGGG TCTCCTCTGA GTGATTGACT ACCCAGACG  
GAGCGACAAG GAACCTCTCC AGAGGAGACT CACTAACTGA TGGGTGCTGC

Fig. 18-2

```

751  GGGGTCTTTC ATTTGGGGGC TCGTCCGGGA TTGGGAGACC CCTGCCCAGG
      CCCCAGAAAG TAAACCCCCG AGCAGGCCCT AACCTCTGG GGACGGGTCC
-----
801  GACCACCGAC CCACCACCGG GAGTAAGCT GGCCAGCAAC TTATCTGTGT
      CTGGTGGCTG GGTGGTGGCC CTCCATTGGA CCGGTCGTTG AATAGACACA
-----
851  CTGTCCGATT GTCTAGTGTC TATGTTIGAT GTTATGCGCC TGCCTCTGTA
      GACAGGCTAA CAGATCACAG ATACAACTA CAATACGCGG ACGCAGACAT
-----
901  CTAGTTAGCT AACTAGCTCT GTATCTGGCG GACCCGTGGT GGAACGTACG
      GATCAATCGA TTGATCGAGA CATAGACCGC CTGGGCACCA CCTTGACTGC
-----
951  AGTTCTGAAC ACCGGCCGC AACCTGGGA GACGTCCCAG GGACTTTGGG
      TCAAGACTTG TGGCCGGCG TTGGGACCTT CTGCAGGGTC CCTGAACCCC
-----
1001 GGCCGTTTTT GTGGCCCGAC CTGAGGAAGG GAGTCGATGT GGAATCCGAC
      CCGGCACAAA CACCGGGCTG GACTCCTTCC CTCAGCTACA CCTTAGGCTG
-----
1051 CCGGTCAGGA TATGTGGTTC TGGTAGGAGA CGAGAACCTA AAACAGTTCC
      GGGCAGTCCT ATACACCAAG ACCATCCTCT GCTCTTGGAT TTTGTCAAGG
-----
1101 CGCCTCCGTC TGAATTTTGG CTTTCGGTTT GGAACCGAAG CCGCGCGTCT
      GCGGAGGCAG ACTTAAAC GAAAGCCAAA CCTTGGCTTC GGCGCGCAGA
-----
      PstI      PstI
1151 TGCTGCTGC AGCGCTGCAG CATCGTTCG TGTGTCTCT GTCTGACTGT
      ACAGACGACG TCGCGACGTC GTAGCAAGC ACAACAGAGA CAGACTGACA
-----

```

54/85

SUBSTITUTE SHEET (RULE 26)

Fig. 18-3

1201 GTTCTGTAT TTGTCTGAAA ATTAGGGCCA GACTGTACC ACTCCCTTAA  
CAAAGACATA AACAGACTTT TAATCCCGGT CTGACAAATGG TGAGGGAATT  
-----  
1251 GTTTGACCTT AGGTCACCTGG AAAGATGTCG AGCGGATCGC TCACAACCAG  
CAAACTGGAA TCCAGTGACC TTTCTACAGC TCGCCTAGCG AGTGTGTC  
-----  
----- PstI -----  
-----  
1301 TCGGTAGATG TCAAGAAGAG ACGTTGGGTT ACCTTCTGCT CTGCAGAAATG  
AGCCATCTAC AGTTCTTCTC TGCAACCCAA TGGAAGACGA GACGTCTTAC  
-----  
1351 GCCAACCTTT AACGTCGGAT GGCCGCCGAGA CGGCACCTTT AACCGAGACC  
CGGTTGGAAA TTGCAGCCTA CCGGCGTCT GCGGTGAAA TTGGCTCTGG  
-----  
1401 TCATCACCCA GGTAAAGATC AAGTCTTTT CACCTGGCCC GCATGGACAC  
AGTAGTGGT CCAATTCTAG TTCCAGAAAA GTGGACCGGG CGTACCTGTG  
-----  
1451 CCAGACCAGG TCCCCTACAT CGTGACCTGG GAAGCCTTGG CTTTGACCC  
GGTCTGGTCC AGGGGATGTA GCACTGGACC CTTCGGAACC GAAAACTGGG  
-----  
1501 CCTCCCCTGG GTCAAGCCCT TTGTACACC TAAGCCTCCG CCTCCTCTTC  
GGGAGGGACC CAGTTCGGGA AACATGTGG ATTCTGGAGC GGAGGAGAAAG  
-----  
1551 CTCATCCCGC CCGTCTCTC CCCCTGAAC CTCCTCGTTC GACCCGCCCT  
GAGGTAGGCG GGCAGAGAG GGGAACTTG GAGGAGCAAG CTGGGGCGGA  
-----  
1601 CGATCCTCCC TTTATCCAGC CCTCACTCT TCTTAGGCG CCGATGTCTG  
GCTAGGAGGG AATAGGTCTG GGAGTGAGGA AGAGATCCGC GGCCTACAGC  
-----

55/85

1651 TGGGCCCTGG AAATGGCGGA CACCTTCCTG GACACCATGC GGGTTGGGCC  
 ACCCGGACC TTTACCGCCT GTGAAGGAC CTGTGTAGC CCCAACCCCG

1701 CAGGACGTAC GCCGACGTAC GCGATGAGAT CAATAAAGG GGGCGTGAGG  
 GTCCTGCATG CCGCTGCATG CGCTACTCTA GTTATTTTCC CCCGCACTCC

-----  
 ApaLI  
 -----

1751 ACCGGGAGGC GGCCAGAACC GCCGTGCACG ACCCGGAGCG TCCCCTGCTG  
 TGGCCCTCCG CCGTCTTGG CGGCACGTGC TGGGCTTCCG AGGGGACGAC

-----  
 XmaI  
 -----

SmaI  
 -----

AvaI  
 -----

1801 CGCTCTCCCG GGCTGCTGCC CGAAATCGCC CCCAACGCAT CCTTGGGTGT  
 GCGAGAGGGC CCGACGACGG GCCTTAGCGG GGGTTGCGTA GGAACCCACA

1851 GGCACATCGA AGAACCGGCG GGACCGTGAC CGACAGTCCC CGTAATCCCG  
 CCGTGAGCT TCTTGGCCGC CTTGGCACTG GCTGTCAGGG GCATTAGGCC

-----  
 BamHI  
 -----

AvaI  
 -----

1901 TAACCCGTTG AAATTCGTTA ACTCGAGGAT CCGGCTGTGG AATGTGTGTC  
 ATTGGGCAAC TTTAAGCAAT TGAGCTCCTA GGCCGACACC TTACACACAG

Fig. 18-5



```

1951 AGTAGGGTG TGGAAAGTCC CCAGGCTCCC CAGCAGGCAG AAGTATGCAA
      TCAATCCCAC ACCTTTCAGG GGTCCGAGGG GTCGTCCGTC TTCATACGTT
-----
2001 AGCATGCATC TCAATTAGTC AGCAACCAGG TGTGGAAGT CCCAGGGCTC
      TCGTACGTAG AGTTAATCAG TCGTTGGTCC ACACCTTTCA GGGTCCGAG
-----
2051 CCCAGCAGGC AGAAGTATGC AAAGCATGCA TCTCAATTAG TCAGCAACCA
      GGTCTGTCCG TCTTCATACG TTTCGTACGT AGAGTTAATC AGTCGTGGT
-----
2101 TAGTCCCGCC CCTAACTCCG CCATCCCGC CCCTAACTCC GCCAGTTCC
      ATCAGGGCGG GGATTGAGGC GGTAGGGCG GGGATTGAGG CGGTCAAGG
-----
      NcoI
2151 GCCCATTCCTC CGCCCCATGG CTGACTAATT TTTTATTATT ATGCAGAGGC
      CCGGTAAAGAG GCGGGGTACC GACTGATTAA AAAAATAAA TACGTCTCCG
-----
2201 CGAGGGCGCC TCGGCTCTG AGCTATTCCA GAAGTAGTGA GGAGGCTTTT
      GCTCCGGCGG AGCCGGAGAC TCGATAAGGT CTTCATCACT CCTCCGAAAA
-----
      HindIII PstI
2251 TTGGAGGCCT AGGCTTTTGC AAAAGCTTG GGCTGCAGGT CGAGCGGAT
      AACCTCCGGA TCCGAAAACG TTTTTCGAAC CCGACGTCCA GTCCTCCCTA
-----
2301 CTGATCAAGA GACAGGATGA GGATCGTTTC GCATGATTGA ACAAGATGGA
      GACTAGTTCT CTGTCCTACT CCTAGCAAAG CGTACTAAT TGTCTACCT
-----

```

Fig. 18-6

Fig. 18-7

2351 TTGCACGCAG GTTCTCCGGC CGCTTGGGTG GAGAGGCTAT TCGGCTATGA  
AACGTGCGTC CAAGAGGCCG GCGAACCCAC CTCCTCCGATA AGCCGATACT

2401 CTGGGCACAA CAGACAATCG GCTGCTCTGA TGCCGCCGTG TTCCGGCTGT  
GACCCGTGTT GTCTGTTAGC CGACGAGACT ACGGCGGCAC AAGGCCGACA

2451 CAGCGCAGGG GCGCCCGGTT CTTTGTGCA AGACCGACCT GTCCGGTGCC  
GTCGCGTCCC CGCGGGCCAA GAAAACAGT TCTGGCTGGA CAGGCCACGG

-----  
PstI  
-----

2501 CTGAATGAAC TGCAGGACGA GGCAGGCGG CTATCGTGGC TGGCCACGAC  
GACTTACTTG ACGTCCTGCT CCGTCGCGCC GATAGCACCG ACCGGTGCTG

2551 GGGCGTTCCT TCGGCAGCTG TGCTCGACGT TGTCACTGAA GCGGGAAGGG  
CCCGCAAGGA ACGCGTCGAC ACGAGCTGCA ACAGTGACTT CGCCCTTCCC

2601 ACTGGCTGCT ATTGGGCGAA GTGCCGGGGC AGGATCTCCT GTCATCTCAC  
TGACCGACGA TAACCCGCTT CACGGCCCCG TCCTAGAGGA CAGTAGAGTG

2651 CTTGCTCCTG CCGAGAAAGT ATCCATCATG GCTGATGCAA TGCGGCGGCT  
GAACGAGGAC GGCTCTTTCA TAGGTAGTAC CGACTACGTT ACGCCGCCGA

2701 GCATACGCTT GATCCGGCTA CCTGCCCATT CGACCACCAA GCGAAACATC  
CGTATGCGAA CTAGGCCGAT GGACGGGTAA GCTGGTGTT CGCTTGTAG

2751 GCATCGAGCG AGCAGTACT CGGATGGAAG CCGGTCTTGT CGATCAGGAT  
CGTAGCTCGC TCGTGCATGA GCCTACCTTC GGCCAGAACA GCTAGTCCTA

```

2801  GATCTGGACG AAGAGCATCA GGGGCTCGG CCAGCCGAAC TGTTGCCAG
      CTAGACCTGC TTCTCGTAGT CCCCAGCGC GGTCGGCTTG ACAAGCGGTC
      -----
      NcoI
      ~~~~~
2851  GCTCAAGGCG CGCATGCCG ACGGCGAGGA TCTCGTCGTG ACCATGGCG
      CGAGTTCCGC GGTACGGC TGCCGCTCCT AGAGCAGCAC TGGGTACCGC
      -----
2901  ATGCCTGCTT GCCGAATATC ATGGTGGAAA ATGGCCGCTT TTCTGGATT
      TACGGACGAA CGGCTTATAG TACCACCTTT TACCGGCGAA AAGACCTAAG
      -----
2951  ATCGACTGTG GCCGGCTGGG TGTGGCGGAC CGCTATCAGG ACATAGCGTT
      TAGCTGACAC CGGCCGACCC ACACCGCTG GCGATAGTCC TGTATCGCAA
      -----
3001  GGCTACCCGT GATATTGCTG AAGAGCTTGG CGGCGAATGG GCTGACCCGT
      CCGATGGGCA CTATAACGAC TTCTCGAACC GCCGCTTACC CGACTGGCGA
      -----
3051  TCCTCGTGCT TTACGGTATC GCCGCTCCCG ATTGCGAGCG CATGCCCTTC
      AGGAGCACGA AATGCCATAG CGGCGAGGGC TAAGCGTCGC GTAGCGGAAG
      -----
3101  TATCGCCTTC TTGACGAGTT CTTCIGAGCG GGACTCTGGG GTTCGATAAA
      ATAGCGGAAG AACTGCTCAA GAAGACTCGC CCTGAGACCC CAAGCTATT
      -----
3151  ATAAAAGATT TTATTTAGTC TCCAGAAAAA GGGGGGAATG AAAGACCCCA
      TATTTTCTAA AATAAATCAG AGGTCTTTTT CCCCCCTTAC TTTCTGGGGT
      -----
3201  CCTGTAGGTT TGGCAAGCTA GCTTAAGTAA CGCCATTGCG CAAGGCATGG
      GGACATCCAA ACCGTTCCGAT CGAATTCAAT GCGGTAAAC GTTCCGTACC
      -----

```

59/85

SUBSTITUTE SHEET (RULE 26)

Fig. 18-8

```

3251  AAAAATACAT AACTGAGAAT AGAGAAGTTC AGATCAAGGT CAGGAACAGA
      TTTTATATGTA TTGACTCTTA TCTCTTCAAG TCTAGTTCCA GTCCTTGTCT
-----
3301  TGGAACAGCT GAATATGGC CAAACAGGAT ATCTGTGGTA AGCAGTTCCCT
      ACCTTGTCGA CTTATACCCG GTTTGTCTTA TAGACACCAT TCGTCAAGGA
-----
3351  GCCCGGCTC AGGCCAAGA ACAGATGGAA CAGCTGAATA TGGCCAAAC
      CGGGCCGAG TCCCGGTTCT TGTCTACCTT GTCGACTTAT ACCCGGTTTG
-----
3401  AGGATATCTG TGGTAAGCAG TTCCTGCCCC GGCTCAGGC CAAGAACAGA
      TCCTATAGAC ACCATTCTGC AAGGACGGG CCGAGTCCCG GTTCTTGTCT
-----
3451  TGGTCCCCAG ATGCGGTCCA GCCCTCAGCA GTTCTTAGAG AACCATCAGA
      ACCAGGGGTC TACGCCAGGT CGGAGTCGT CAAAGATCTC TTGGTAGTCT
-----
3501  TGTTTCCAGG GTGCCCCAAG GACCTGAAT GACCCGTGTC CTTATTTGAA
      ACAAGGTCC CACGGGGTTC CTGGACTTTA CTGGACACG GAATAAACTT
-----
                                     Aval
-----
3551  CTAACCAATC AGTTCGCTC TCGTTCTGT TCGCGCGCTT CTGCTCCCCG
      GATTGGTTAG TCAAGCGAAG AGCGAAGACA AGCGCGGAA GACGAGGGC
-----
                                     Aval
-----
3601  AGCTCAATAA AAGAGCCAC AACCCCTCAC TCGGGCGCC AGTCCTCCGA
      TCGAGTTATT TTCTCGGGTG TTGGGGAGTG AGCCCCGGG TCAGGAGGCT
-----

```

XmaI  
~~~~~  
SmaI  
~~~~~  
AvaI

```

3651 TTGACTGAGT CGCCCGGGTA CCCGTGTATC CAATAAACCC TCTTGCACTT
      AACTGACTCA GCGGGCCCAT GGGCACATAG GTTATTGGG AGAACGTCAA
-----
3701 GCATCCGACT TGTGGTCTCG CTGTTCCCTTG GGAGGGTCTC CTC TGAGTGA
      CGTAGGCTGA ACACCAGAGC GACAAGGAAC CCTCCCAGAG GAGACTCACT
-----
3751 TTGACTACCC GTCAGCGGGG GTCCTTCAIT TGGGGGCTCG TCCGGGATCG
      AACTGATGGG CAGTCGCCCC CAGAAAGTAA ACCCCCGAGC AGGCCCTAGC
-----
3801 GGAGACCCCT GCCCAGGGAC CACCGACCCA CCACCGGGAG GTAAGCTGGC
      CCTCTGGGGA CGGGTCCCTG GTGGCTGGGT GGTGGCCCTC CATTGACCG
-----
3851 TGCCTCGGC GTTTCGGTGA TGACGGTGAA AACCTCTGAC ACATGCAGCT
      ACGGAGCGCG CAAAGCCACT ACTGCCACTT TTGGAGACTG TGTACGTCGA
-----
3901 CCCGGAGACG GTCACAGCTT GTCTGTAAGC GGATGCCGGG AGCAGACAAG
      GGGCCTCTGC CAGTGTGAA CAGACATTG CCTACGGCCC TCGTCTGTTC
-----
3951 CCCGTCAGGG CGCGTCAGCG GGTGTGGCG GGTGTGGGG CGCAGCCATG
      GGGCAGTCCC GCGCAGTCG CCACAACCGC CCACAGCCCC GCGTCGGTAC
-----
4001 ACCCAGTCAC GTAGCGATAG CGGAGTGTAT ACTGGCTTAA CTATGCCGCA
      TGGGTCAGTG CATCGCTATC GCCTCACATA TGACCGAATT GATACGCCGT
-----

```

61/85

SUBSTITUTE SHEET (RULE 26)

Fig. 18-10

## ApaLI

```

4051 TCAGAGCAGA TTGTACTGAG AGTGCACCAT ATGCGGTGTG AAATACCGCA
      AGTCTCGTCT AACATGACTC TCACGTGGTA TACGCCACAC TTTATGGCGT
-----
4101 CAGATGCGTA AGGAGAAAAT ACCGCATCAG GCGCTCTTCC GCTTCTCTGC
      GTCTACGCAT TCCTCTTTTA TGGCGTAGTC CGCGAGAAGG CGAAGGAGCG
-----
4151 TCACTGACTC GTGCGCTCG GTCGTTCCGC TGGGCGGAGC GGTATCAGCT
      AGTGACTGAG CGACGCGAGC CAGCAAGCCG ACGCCGCTCG CCATAGTCGA
-----
4201 CACTCAAAGG CGGTAATACG GTTATCCACA GAATCAGGGG ATAACGCAGG
      GTGAGTTTCC GCCATTATGC CAATAGGTGT CTTAGTCCCC TATTGCGTCC
-----
4251 AAAGAACATG TGAGCAAAAG GCCAGCAAAA GGCCAGGAAC CGTAAAAAAG
      TTTCTTGTAC ACTCGTTTTC CGGTCGTTTT CCGGTCCCTG GCATTTTTC
-----
4301 CCGCGTTGCT GCGGTTTTC CATAGGCTCC GCCCCCCCTGA CGAGCATCAC
      GCGCAACGA CCGCAAAAAG GTATCCGAGG CGGGGGGACT GCTCGTAGTG
-----
4351 AAAAATCGAC GCTCAAGTCA GAGGTGGCGA AACCCGACAG GACTATAAAG
      TTTTATAGCTG CGAGTTCAGT CTCCACCGCT TTGGGCTGTC CTGATATTTC
-----
4401 ATACCAAGCG TTTCCCCCTG GAAGTCCCTT CGTGGCTCTT CCTGTTCGGA
      TATGGTCCGC AAAGGGGAC CTTGAGGGA GCACGCGAGA GGACAAGGCT
-----
4451 CCTGCGGCT TACCGGATAC CTGTCCGCCT TTCTCCCTTC GGAAGCGTG
      GGGACGGCGA ATGGCCTATG GACAGGCGGA AAGAGGGAAG CCTTCGCAC
-----

```

62/85

SUBSTITUTE SHEET (RULE 26)

Fig. 18-11

4501 GCGTTTCTC ATAGCTCAG CTGTAGGTAT CTCAGTTCGG TGTAAGTCGT  
CGCGAAAGAG TATCGAGTGC GACATCCATA GAGTCAAGCC ACATCCAGCA  
-----  
ApalI  
-----  
4551 TCGCTCCAAG CTGGGCTGTG TGCACGAACC CCCCCTTCAG CCGACCGCT  
AGCGAGGTTT GACCCGACAC ACGTGCTTGG GGGCAAGTC GGGCTGGCGA  
-----  
4601 GCGCCTTATC CGGTAACTAT CGTCTTGAGT CCAACCCCGT AAGACACGAC  
CGCGGAATAG GCCATTGATA GCAGAACTCA GGTGGGCCA TTCTGTGCTG  
-----  
4651 TTATCGCCAC TGGCAGCAGC CACTGGTAAC AGGATTAGCA GAGCGAGGTA  
AATAGCGGTG ACCGTCGTCG GTGACCATTTG TCCTAATCGT CTCGCTCCAT  
-----  
4701 TGTAAGCGGT GCTACAGAGT TCTTGAAGTG GTGGCCTAAC TACGGCTACA  
ACATCCGCCA CGATGTCTCA AGAACTTCAC CACCGGATG ATGCCGATGT  
-----  
4751 CTAGAAGGAC AGTATTGGT ATCTGGCTC TGCTGAAGCC AGTTACCTTC  
GATCTTCCCTG TCATAAACC A TAGACGCGAG ACGACTTCGG TCAATGGAAG  
-----  
4801 GGAAAAAGAG TTGGTAGCTC TTGATCCGGC AAACAACCA CCGTGGTAG  
CCTTTTCTC AACCATCGAG AACTAGGCCG TTGTGTTGGT GCGACCATC  
-----  
4851 CCGTGGTTTT TTGTGTTGCA AGCAGCAGAT TACGCGCAGA AAAAAGGAT  
GCCACCAAAA AAACAACCGT TCCTCGTCTA ATGCGCGTCT TTTTTCCTA  
-----  
4901 CTCAAGAAGA TCCTTGATC TTTTCTACGG GGTCTGACGC TCAGTGAAC  
GAGTCTTCT AGGAAACTAG AAAAGATGCC CCAGACTGCG AGTCACCTTG  
-----

4951 GAAAACTCAC GTTAAGGGAT TTTGGTCATG AGATTATCAA AAAGGATCTT  
CTTTTGAGTG CAATTCCCTA AAACCAGTAC TCTAATAGTT TTTCTTAGAA  
-----  
5001 CACCTAGATC CTTTAAATTT AAAAATGAAG TTTTAAATCA ATCTAAAGTA  
GTGGATCTAG GAAAATTTAA TTTTACTTC AAAATTAGT TAGATTTCAT  
-----  
5051 TATATGAGTA AACTTGGTCT GACAGTTACC AATGCTTAAT CAGTGAGGCA  
ATATACTCAT TTGAACCAGA CTGTCAATGG TTACGAATTA GTCACCTCCGT  
-----  
5101 CCTATCTCAG CGATCTGTCT ATTTCTGTTCA TCCATAGTTG CCTGACTCCC  
GGATAGAGTC GCTAGACAGA TAAAGCAAGT AGGTATCAAC GGACTGAGGG  
-----  
5151 CGTCGTGTAG ATAACTACGA TACGGGAGGG CTTACCATCT GGCCCCAGTG  
GCAGCACATC TATTGATGCT ATGCCCTCCC GAATGGTAGA CCGGGGTCAC  
-----  
5201 CTGCAATGAT ACCGCGAGAC CCACGCTCAC CGGCTCCAGA TTTATCAGCA  
GACGTTACTA TGGCGCTCTG GGTGCGAGTG GCCGAGGTCT AAATAGTCGT  
-----  
5251 ATAAACCAGC CAGCCGGAAG GGCCGAGCGC AGAAGTGGTC CTGCAACTTT  
TATTGGTCTG GTCGGCCTTC CCGCTCGCG TCTTACCAG GACGTTGAAA  
-----  
5301 ATCCGCCTCC ATCCAGTCTA TTAATTGTTG CCGGGAAGCT AGAGTAAGTA  
TAGCGGGAGG TAGGTCAGAT AATTAACAAC GGCCCTTCCA TCTCATTCAT  
-----  
-----  
PstI  
-----  
5351 GTTCGCCAGT TAATAGTTTG CGCAACGTTG TTGCCATTGC TGCAGGCATC  
CAAGCGGTCA ATTATCAAAC CGGTGCAAC AACGGTAACG ACGTCCGTAG  
-----

*Fig. 18-13*



5401 GTGGTGTAC GCTCGTCGTT TGGTATGGCT TCATTTCAGCT CCGTTTCCCA  
CACCAACAGT CGAGCAGCAA ACCATACCGA AGTAAGTCGA GGCCAAGGGT  
-----  
5451 ACGATCAAG CGAGTTACAT GATCCCCCAT GTGTGCAAA AAAGCGGTTA  
TGCTAGTTCC GCTCAATGTA CTAGGGGGTA CAACACGTTT TTTCGGCCAAT  
-----  
5501 GCTCCTTCGG TCCTCCGATC GTGTGCAGAA GTAAGTTGGC CGCAGTGTTA  
CGAGGAAGCC AGGAGGCTAG CAACAGTCTT CATTCAACCG GCGTCACAAT  
-----  
5551 TCACTCATGG TTATGGCAGC ACTGCATAAT TCTCTTACTG TCATGCCATC  
AGTGAGTACC AATACCGTCG TGACGTATTA AGAGAAATGAC AGTACGGTAG  
-----  
5601 CGTAAGATGC TTTTCTGTGA CTGGTGAGTA CTCAACCAAG TCATTCTGAG  
GCATTCTACG AAAAGACACT GACCACTCAT GAGTTGGTTC AGTAAGACTC  
-----  
5651 AATAGTGTAT GCGGCGACCG AGTTGCTCTT GCCCGCGTC AACACGGGAT  
TTATCACATA CGCCGCTGGC TCAACGAGAA CGGGCCGCAG TTGTGCCCTA  
-----  
5701 AATACCGCG CACATAGCAG AACTTTAAAA GTGCTCATCA TTGGAAAACG  
TTATGGGCGG GTGTATCGTC TTGAAATTTT CACGAGTAGT AACCTTTTGC  
-----  
5751 TTCTTCGGGG CGAAAACCTT CAAGGATCTT ACCGCTGTTG AGATCCAGTT  
AAGAAGCCCC GCTTTTGAGA GTTCCTAGAA TGGCGACAAC TCTAGGTCAA  
-----  
-----  
5801 CGATGTAACC CACTCGTGCA CCCAACTGAT CTTCAGCATC TTTTACTTTC  
GCTACATTGG GTGAGCACGT GGGTTGACTA GAAGTCGTAG AAAATGAAAG  
-----

ApaLI  
~~~~~

Fig. 18-14

*Fig. 18-15*

5851 ACCAGCGTTT CTGGGTGAGC AAAACAGGA AGGCAAAATG CCGCAAAAA  
TGGTCGCAAA GACCCACTCG TTTTGTGCTT TCCGTTTAC GCGGTTTTT  
-----  
5901 GGGAAATAGG GCGACACGGA AATGTGAAT ACTCATACTC TTCCTTTTTC  
CCCTTATTCC CGCTGTGCTT TTACAACCTA TGAGTATGAG AAGGAAAAAG  
-----  
5951 AATATTATTG AAGCATTTAT CAGGGTTATT GTCTCATGAG CGGATACATA  
TTATAATAAC TTCGTAAATA GTCCCAATAA CAGAGTACTC GCCTATGTAT  
-----  
6001 TTTGAATGTA TTTAGAAAAA TAAACAAATA GGGTTCCGC GCACATTTCC  
AAACTTACAT AATCTTTTTT ATTGTTTAT CCCCAAGGCG CGTGTAAGG  
-----  
6051 CCGAAAAGTG CCACCTGACG TCTAAGAAAC CATATTATC ATGACATTAA  
GGCTTTTCAC GGTGGACTGC AGATTCTTTG GTAATAATAG TACTGTAATT  
-----  
6101 CCTATAAAAA TAGGCGTATC ACGAGGCCCT TTCGTCTTCA A  
GGATATTTTT ATCCGCATAG TGCTCCGGA AAGCAGAAGT T  
-----

66/85

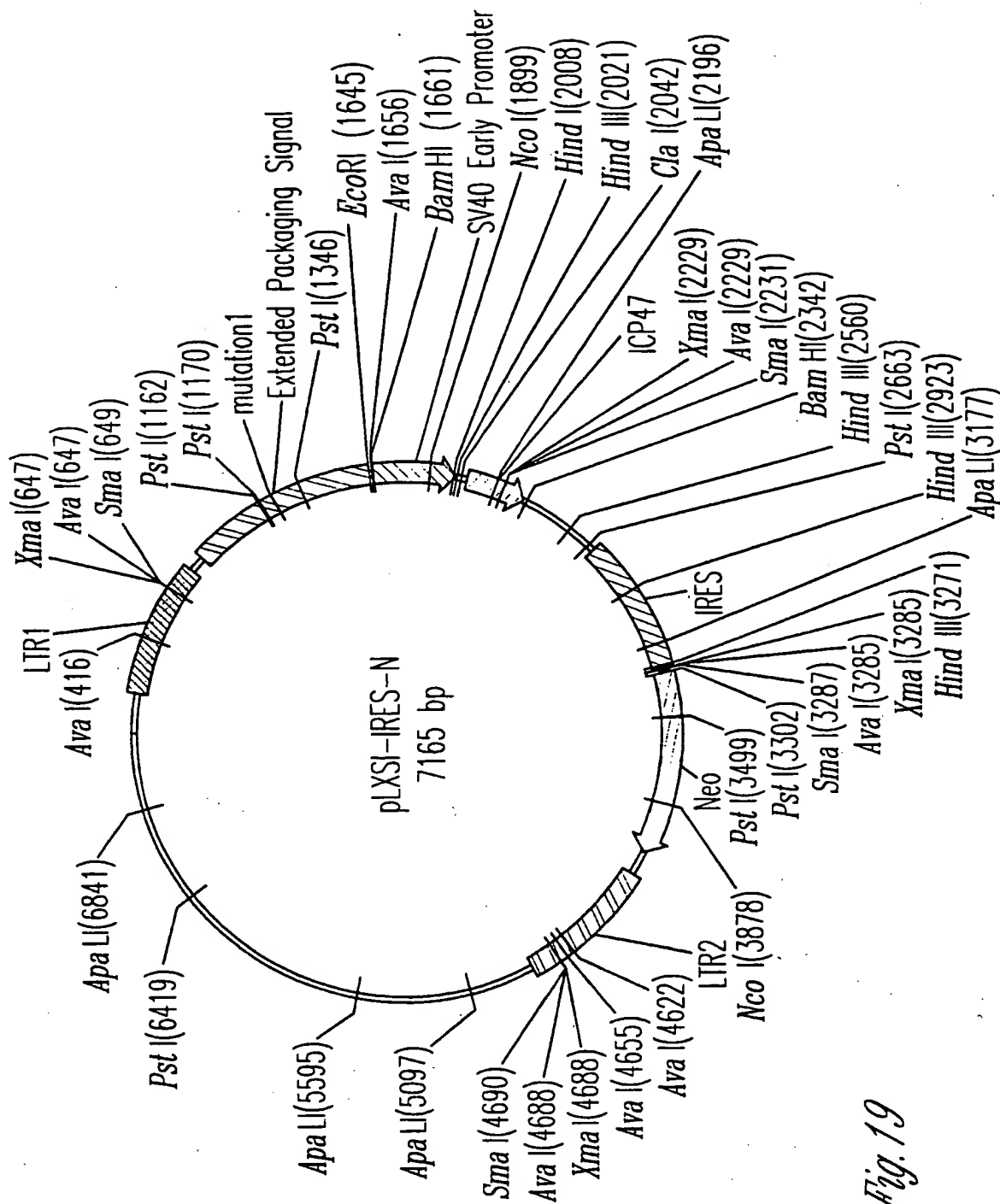


Fig. 19

1 GAATTGCTAG CAATTGCTAG CAATTGCTAG CAATTCATAC CAGATCACCG  
 CTTAACGATC GTTAACGATC GTTAACGATC GTTAAGTATG GTCTAGTGGC  
 -----  
 51 AAAACTGTCC TCCAAATGTG TCCCCCTCAC ACTCCCAAAT TCGCGGGCTT  
 TTTTGACAGG AGGTTTACAC AGGGGGAGTG TGAGGGTTTA AGCGCCCGAA  
 -----  
 101 CTGCCCTCTTA GACCACTCTA CCTATTCCC CACACTCAC GGAGCCAAAG  
 GACGGAGAAT CTGGTGAGAT GGGATAAGG GTGTGAGTGG CCTCGGTTTC  
 -----  
 151 CCGCGGCCCT TCCGTTTCTT TGCCTTTGAA AGACCCACCC CGTAGGTGGC  
 GCGCGCCGGA AGGCAAGAA ACGAAACTT TCTGGGGTGG GCATCCACCG  
 -----  
 201 AAGCTAGCTT AAGTAACGCC ACTTTGCAAG GCATGGAAAA ATACATAACT  
 TTCGATCGAA TTCATTGCGG TGAAACGTC CGTACCCTTT TATGTATTGA  
 -----  
 251 GAGAAATAGAA AAGTTCAGAT CAAGGTCAGG AACAAAGAAA CAGCTGAATA  
 CTCCTATCTT TTCAAAGTCTA GTTCCAGTCC TTGTTTCTTT GTCGACTTAT  
 -----  
 301 CCAAAACAGGA TATCTGTGGT AAGCGGTTC TGCCCGGCT CAGGGCCAAG  
 GGTTCGTCTT ATAGACACCA TTCGCCAAGG ACGGGGCCGA GTCCCGGTTTC  
 -----  
 351 AACAGATGAG ACAGCTGAGT GATGGGCCAA ACAGGATATC TGTGTAAGC  
 TTGTCTACTC TGTCGACTCA CTACCCGGTT TGTCCTATAG ACACCATTCG  
 -----  
 Aval  
 -----  
 401 AGTTCCTGCC CCGGCTCGGG GCCAAGAACA GATGTCCTCC AGATCGGGTC  
 TCAAGGACCG GGCCGAGCCC CGGTTCTTGT CTACCAGGGG TCTACGCCAG  
 -----

68/85

SUBSTITUTE SHEET (RULE 26)

Fig. 20-1

451 CAGCCCTCAG CAGTTTCTAG TGAATCATCA GATGTTTCCA GGGTGCCCCA  
GTCGGGAGTC GTCAAAGATC ACTTAGTAGT CTACAAAGGT CCCACGGGGT

501 AGGACCTGAA AATGACCCCTG TACCTTATT GAACTAACCA ATCAGTTTCG  
TCCTGGACTT TTA CTGGGAC ATGGAATAA CTTGATTGGT TAGTCAAGCG

551 TTCTCGCTTC TGTTCCGCGG CTTCCGCTCT CCGAGCTCAA TAAAGAGGCC  
AAGAGCGAAG ACAAGCGCGC GAAGGCGAGA GGCTCGAGTT ATTTTCTCGG

XmaI

~~~~~

SmaI

~~~~~

AvaI

~~~~~

601 CACAACCCCT CACTCGGCGC GCCAGTCTTC CGATAGACTG CGTCGCCCGG  
GTGTTGGGGA GTGAGCCCGC CGGTCAGAA GCTATCTGAC GCAGCGGGCC

XmaI

~

SmaI

~

AvaI

651 GTACCCCGTAT TCCCAATAAA GCCTCTTGCT GTTTGCATCC GAATCGTGGT  
CATGGGCATA AGGGTTATTT CGGAGAACGA CAAACGTAGG CTTAGCACCA

701 CTCGCTGTTT CTTGGGAGGG TCTCCTCTGA GTGATTGACT ACCCAGCAGC  
GAGCGACAAG GAACCTCTCC AGAGGAGACT CACTAACTGA TGGGTGCTGC

Fig. 20-2

69/85

```

751 GGGGTCTTTC ATTTGGGGGC TCGTCGGGA TTTGGAGACC CCTGCCCAGG
    CCCAGAGAAAG TAAACCCCGG AGCAGGCCCT AAACCTCTGG GGACGGGTCC
-----
801 GACCACCGAC CCACCACCGG GAGTAAGCT GGCCAGCAAC TTATCTGTGT
    CTGGTGGCTG GGTGGTGGCC CTCATTCTGA CCGTTCGTG AATAGACACA
-----
851 CTGTCCGATT GTCTAGTGTG TATGTTTGAT GTTATGCGCC TGCCTCTGTA
    GACAGGCTAA CAGATCACAG ATACAAACTA CAATACGCGG ACGCAGACAT
-----
901 CTAGTTAGCT AACTAGCTCT GTATCTGGCG GACCCGTGGT GGAATCGACG
    GATCAATCGA TTGATCGAGA CATAGACCGC CTGGGCACCA CCTTGACTGC
-----
951 AGTTCCTGAAC ACCCGGCCGC AACCTGGGA GACGTCCAG GGACTTTGGG
    TCAAGACTTG TGGCCCGCGG TTGGGACCCT CTGCAGSGTC CCTGAAACCC
-----
1001 GGCCGTTTTT GTGGCCCGAC CTGAGGAAGG GAGTCGATGT GGAATCCGAC
    CCGGCAAAA CACCGGGCTG GACTCCTTCC CTCAGCTACA CCTTAGGCTG
-----
1051 CCCGTCAGGA TATGTGGTTC TGGTAGGAGA CGAGAACCTA AAACAGTTCC
    GGCAGTCCT ATACACCAAG ACCATCCTCT GCTCTTGGAT TTTGTCAAGG
-----
1101 CGCCTCCGTC TGAATTTTGG CTTTCGGTTT GGAACCGAAG CCGCGCGTCT
    GCGGAGGCAG ACTTAAAAAC GAAAGCCAA CTTGGCTTC GGCGCGCAGA
-----
                                PstI      PstI
1151 TGTCTGCTGC AGCGCTGCAG CATCGTCTG TGTGTCTCT GTCTGACTGT
    ACAGACGACG TCGCGACGTC GTAGCAAGAC ACAACAGAGA CAGACTGACA
-----

```

Fig. 20-3

1201 GTTCTGTAT TTGTCTGAAA ATTAGGGCCA GACTGTTACC ACTCCCTTAA  
CAAAGACATA AACAGACTTT TAATCCCGGT CTGACAATGG TGAGGGAATT  
-----  
1251 GTTTGACCTT AGGTCACTGG AAAGATGTCG AGCGATCGC TCACAACCCAG  
CAAACCTGGAA TCCAGTGACC TTCTACAGC TCGCCTAGCG AGTGTGGTC  
-----  
PstI  
-----  
1301 TCGGTAGATG TCAAGAAGAG ACGTTGGGT ACCTTCTGCT CTGCAGAATG  
AGCCATCTAC AGTTCTTCTC TGCAACCCAA TGGAAGACGA GACGTCTTAC  
-----  
1351 GCCAACCTTT AACGTCGGAT GCGCGCGAGA CGGCACCTTT AACCGAGACC  
CGGTTGGAAA TTGCAGCCTA CCGGCGCTCT GCCGTGGAAA TTGGCTCTGG  
-----  
1401 TCATCACCCA GGTTAAGATC AAGTCTTTT CACCTGGCCC GCATGGACAC  
AGTAGTGGGT CCAATTCTAG TTCCAGAAAA GTGGACCGGG CGTACCTGTG  
-----  
1451 CCAGACCAGG TCCCCTACAT CGTGACCTGG GAAGCCTTGG CTTTGACCC  
GGTCTGGTCC AGGGATGTA GCACTGGACC CTTCGGAACC GAAACTGGG  
-----  
1501 CCTCCCTGG GTCAAGCCCT TTGTACACCC TAAGCCTCCG CCTCCTCTTC  
GGGAGGGACC CAGTTCGGGA AACATGTGG ATTCTGGAGC GGAGGAGAAG  
-----  
1551 CTCCATCCGC CCCGTCTCTC CCCCTGAAC CTCCTCGTTC GACCCCGCCT  
GAGGTAGGCG GGGCAGAGAG GGGGAACCTG GAGGAGCAAG CTGGGGCGGA  
-----

71/85

SUBSTITUTE SHEET (RULE 26)

Fig. 20-4

NOT FURNISHED AT TIME OF PUBLICATION



```

1951  CTGAGCTATT CCAGAAGTAG TGAGGAGGCT TTTTGGAGG CCTAGGCTTT
      GACTCGATAA GGTCTTCATC ACTCCTCCGA AAAAACCTCC GGATCCGAAA
-----
      HindIII      HindIII      ClaI
      ~~~~~      ~~~~~      ~~~~~
2001  TGCAAAAAGC TTGGGCTGCA AGCTTGATC CGAGCTCGGA TCGATATCTG
      ACGTTTTCG AACCCGACGT TCGAACCATG GCTCGAGCCT AGCTATAGAC
-----
2051  CGGCCGCGTC GACGGATGTC GTGGGCCCTG GAAATGGCGG ACACCTTCCT
      GCCGGGCGAG CTGCCTACAG CACCCGGGAC CTTTACCGCC TGTGGAAGGA
-----
2101  GGACACCATG CGGGTTGGG CCAGGACGTA CGCCGACGTA CGCGATGAGA
      CCTGTGGTAC GCCCAACCCG GTCCCTGCAT GCGGCTGCAT GCGCTACTCT
-----
      ApaLI
      ~~~~~
2151  TCAATAAAAG GGGGCGTGAG GACCGGGAGG CGGCCAGAAC CGCCGTGCAC
      AGTTATTTTC CCCCCTACTC CTGGCCCTCC GCCGGTCTTG GCGGCACGTG
-----
      XmaI
      ~~~~~
      SmaI
      ~~~~~
      Aval
      ~~~~~
2201  GACCCGGAGC GTCCCCTGCT GCGCTCTCCC GGGCTGCTGC CCGAAATCGC
      CTGGGCCTCG CAGGGGACGA CGGAGAGGG CCCGACGACG GGCTTTAGCG
-----

```

Fig. 20-6

2251 CCCAACGCA TCCTTGGGTG TGGACATCG AAGAACGGC GGGACCGTGA  
GGGTTGCGT AGGAACCCAC ACCGTGTAGC TTCTTGGCCG CCTTGGCACT

BamHI

2301 CCGACAGTCC CCGTAATCCG GTAACCCGTT GAAATTCAGT GGATCCACTA  
GGCTGTCAGG GGCATTAGGC CATTTGGGCAA CTTTAAGTCA CCTAGGTGAT

2351 GTAACGGCCG CCAAGTGTGCT GGAATTAAAT CGCTGTCTGC GAGGGCCGGC  
CATTGCCGGC GGTACACACGA CCTTAATTAA GCGACAGACG CTCCCGGGCCG

2401 TGTGGGGTG AGTACTCCCT CTCAAAAGCG GGCATGACTT CTGCGCTAAG  
ACAACCCAC TCATGAGGGA GAGTTTTCGC CCGTACTGAA GACGCGATTTC

2451 ATTGTCAAGT TCCAAAACG AGGAGGATTT GATATTCACC TGGCCCGCGG  
TAACAGTCAA AGGTTTTCGC TCCTCCTAAA CTATAAGTGG ACCGGGCGCC

2501 TGATGCCCTT GAGGTGGCC GGTCCATCT GGTACAGAAA GACAATCTTT  
ACTACGGAAA CTCCACCCGG CGCAGGTAGA CCAGTCTTTT CTGTTAGAAA

HindIII

2551 TTGTTGTCAA GCTTGAGGTG TGGCAGGCTT GAGATCTGGC CATACTTG  
AACACAGTT CGAACTCCAC ACCGTCCGAA CTCTAGACCG GTATGTGAAC

2601 AGTGACAAATG ACATCCACTT TGCCTTCTC TCCACAGGTG TCCACTCCCA  
TCACGTGTAC TGTAGGTGAA ACGGAAAGAG AGGTGTCCAC AGGTGAGGCT

PstI

2651 GGTCCAAC TG CAGGTGATC GAGCATGCAT CTAGGGCGGC CAATTCGCC  
CCAGGTTGAC GTCCAGCTAG CTCGTACGTA GATCCGCGG GTTAAGCGGG

2701 CTCCTCCCTCC CCCCCCCTA ACGTTACTGG CCGAAGCCGC TTGGAATAAG  
GAGAGGGAGG GGGGGGGGAT TGCAATGACC GGCTTCGGCG AACCTTATTC

2751 GCCGGTGTGT GTTTGTCTAT ATGTGATTTT CCACCATATT GCCGTCTTTT  
CGGCCACACA CAAACAGATA TACACTAAAA GGTGGTATAA CGGCAGAAAA

2801 GGCAATGTGA GGGCCCGGAA ACCTGGCCCT GTCTTCTTGA CGAGCATTC  
CCGTTACTACT CCGGGCCCTT TGGACCGGGA CAGAAGAACT GCTCGTAAGG

2851 TAGGGGTCTT TCCCTCTCTG CCAAAGGAAT GCAAGGTCTG TTGAATGTG  
ATCCCCAGAA AGGGGAGAGC GGTTCCTTGA CGTCCAGAC AACTTACAGC

HindIII

2901 TGAAGGAAGC AGTTCCTCTG GAAGCTTCTT GAAGACAAAC AACGTCTGTA  
ACTTCCTTCG TCAAGGAGAC CTTCGAAGAA CTTCTGTTTG TTGCAGACAT

2951 GCGACCTTTT GCAGGCAGCG GAACCCCCCA CCTGGCGACA GGTGCCTCTG  
CGCTGGGAAA CGTCCGTCGC CTTGGGGGGT GGACCGCTGT CCACGGAGAC

3001 CGGCCAAAAG CCACGTGTAT AAGATACACC TGCAAGGCG GCACAAACCC  
GCCGGTTTTC GGTGCACATA TTCTATGTGG ACGTTCCGC CGTGTGGGG

3051 AGTGCCACGT TGTAGTTGG ATAGTTGTGG AAAGAGTCAA ATGGCTCTCC  
TCACGGTGCA AACTCAACC TATCAACACC TTTCTCAGTT TACCGAGAGG

```

3101 TCAAGCGTAG TCAACAAGGG GCTGAAGGAT GCCAGAAGG TACCCATTG
      AGTTCGCATC AGTTGTTCCC CGACTTCCTA CCGTCTTCC ATGGGGTAAC
      -----
      ApaLI
      ~~~~~
3151 TATGGGAATC TGATCTGGG CCTCGGTGCA CATGCTTAC ATGTGTTTAG
      ATACCCTTAG ACTAGACCCC GGAGCCACGT GTACGAAATG TACACAAATC
      -----
3201 TCGAGGTTAA AAAAGCTCTA GGCCCCCGA ACCACGGGA CGTGGTTTTC
      AGTCCAATT TTTTCGAGAT CCGGGGGCT TGGTGCCCT GCACCAAAAG
      -----
      XmaI
      ~~~~~
      SmaI
      ~~~~~
      Aval
      ~~~~~
3251 CTTTGAAAAA CACGATGATA AGCTTGCCAC AACCCCGGA TAATTCCTGC
      GAAACTTTTT GTGCTACTAT TCGAACGGTG TTGGGGCCCT ATTAAGGACG
      -----
      PstI
      ~~~~~
3301 AGCCAATATG GGATCGGCCA TTGAACAAGA TGGATTGCAC GCAGGTTCTC
      TCGGTTATAC CCTAGCCGT AACTTGTCT ACCTAACGTG CGTCCAAGAG
      -----
3351 CGCCGCTTG GGTGGAGAG CTATTGGCT ATGACTGGC ACAACAGACA
      GCCGGCGAAC CCACCTCTCC GATAAGCCGA TACTGACCCG TGTGTCTGT
      -----
3401 ATCGGCTGCT CTGATGCCG CGTGTTCGG CTGTCAGCG AGGGGCGCCC
      TAGCCGACGA GACTACGGC GCACAAGCC GACAGTCGG TCCCCGCGG
      -----

```

Fig. 20-9

## Pst I

~~~~~  
3451 GGTTCCTTTT GTCAAGACCG ACCTGTCCGG TGCCCTGAAT GAACTGCAGG  
CCAAGAAAAA CAGTCTGGC TGGACAGGCC ACGGACTTA CTTGACGTCC  
-----  
3501 ACGAGGCAGC GCGGCTATCG TGGCTGGCCA CGACGGCGT TCCTTGCGCA  
TGCTCCGTCG CGCCGATAGC ACCGACCGT GCTGCCCGCA AGGAACGCGT  
-----  
3551 GCTGTGCTCG ACGTTGTCAC TGAAGCGGA AGGACTGGC TGCTATTGGG  
CGACACGAGC TGCAACAGTG ACTTCGCCCT TCCCTGACCG ACGATAACCC  
-----  
3601 CGAAGTGCCG GGGCAGGATC TCCTGTATC TCACCTTGCT CCTGCCGAGA  
GCTTCACGGC CCCGTCCTAG AGGACAGTAG AGTGGAAACGA GGACGGCTCT  
-----  
3651 AAGTATCCAT CATGGCTGAT GCAATGCGGC GGCTGCATAC GCTTGATCCG  
TTCATAGGTA GTACCGACTA CGTTACGCCG CCGACGTATG CGAACTAGGC  
-----  
3701 GCTACCTGCC CATTGACCA CCAAGCGAA CATCGCATCG AGCGAGCACG  
CGATGGACGG GTAAGCTGGT GGTTGCTTT GTAGCGTAGC TCGCTCGTGC  
-----  
3751 TACTCGGATG GAAGCCGGTC TTGTCGATCA GGATGATCTG GACGAAGAGC  
ATGAGCCTAC CTTCCGGCCAG AACAGTAGT CCTACTAGAC CTGCTTCTCG  
-----  
3801 ATCAGGGGCT CGCGCCAGCC GAACTGTTCTG CCAGGCTCAA GGCGCGCATG  
TAGTCCCCGA GCGCGGTCCG CTTGACAAGC GTCCGAGTT CCGCGCGTAC  
-----

## NCOI

3851 CCCGACGGCG AGGATCTCGT CGTGACCCAT GCGATGCCT GCTTGCCGAA  
GGGCTGCCGC TCCTAGAGCA GCACTGGTA CCGCTACGGA CGAACGGCTT  
-----  
3901 TATCATGGTG GAAATGGCC GCTTTCTGG ATTCAATGAC TGTGGCCGGC  
ATAGTACCAC CTTTACCAG CGAAAAGACC TAAGTAGCTG ACACCGGCCG  
-----  
3951 TGGGTGTGGC GGACCGCTAT CAGGACATAG CGTTGGCTAC CCGTGATATT  
ACCCACACCG CCTGGCGATA GTCCTGTATC GCAACCGATG GGCACATATA  
-----  
4001 GCTGAAGAGC TTGGCGGCGA ATGGGCTGAC CGTTCCCTCG TGTCTTACGG  
CGACTTCTCG AACCGCCGCT TACCCGACTG GCGAAGGAGC ACGAAATGCC  
-----  
4051 TATCGCCGCT CCCGATTGCG AGCGCATGCG CTTCTATCGC CTTCTTGACG  
ATAGCGGCGA GGGCTAAGCG TCGCGTAGCG GAAAGATAGCG GAAGAACTGC  
-----  
4101 AGTTCTGTC GAGGCGGATC TGATCAAGAG ACAGGATGAG GATCGTTTCG  
TCAAGACCAG CTCGCGCCTAG ACTAGTTCTC TGTCCTACTC CTAGCAAAGC  
-----  
4151 CGCGGGACTC TGGGGTTTGA TAAATATAAA GATTTTATTT AGTCTCCAGA  
GCGCCCTGAG ACCCCAAGCT ATTTTATTTT CTAAATAATA TCAGAGGTCT  
-----  
4201 AAAAGGGGG AATGAAAGAC CCCACCTGTA GGTGTGGCAA GCTAGCTTAA  
TTTTTCCCCC TTACTTTCTG GGTGGACAT CCAAAACCGTT CGATCGAATT  
-----  
4251 GTAACGCCAT TTTGCAAGGC ATGGAATAAT ACATAACTGA GAATAGAGAA  
CATTGCGGTA AAACGTTCCG TACCTTTTTA TGTATTGACT CTTATCTCTT  
-----

78/85

SUBSTITUTE SHEET (RULE 26)

Fig. 20-11

```
4301 GTTCAGATCA AGTCAGGAA CAGATGGAAC AGCTGAATAT GGGCCAAACA
      CAAGTCTAGT TCCAGTCCCTT GTCTACCTTG TCGACTTATA CCCGGTTTGT
-----
4351 GGATATCTGT GGTAAAGCAGT TCCTGCCCCG GCTCAGGGCC AAGAACAGAT
      CCTATAGACA CCATTGCTCA AGGACGGGGC CGAGTCCCGG TTCTTGTCTA
-----
4401 GGAACAGCTG AATATGGCC AAACAGGATA TCTGTGGTAA GCAGTTCCCTG
      CCTTGTCGAC TTATACCCGG TTGTCTCTAT AGACACCATT CGTCAAGGAC
-----
4451 CCCCGGCTCA GGGCCAAGAA CAGATGGTCC CCAGATGCCG TCCAGCCCCTC
      GGGGCCGAGT CCCGGTCTT GTCTACCAGG GGTCTACGCC AGGTCGGGAG
-----
4501 AGCAGTTTCT AGAGAACCAT CAGATGTTTC CAGGGTGCCC CAAGGACCTG
      TCGTCAAAGA TCTCTTGGTA GTCTACAAAG GTCCCACGGG GTTCCCTGGAC
-----
4551 AAATGACCCCT GTGCCCTTATT TGAACATAACC AATCAGTTCC CTTCCTCGCTT
      TTTACTGGGA CACGGAATAA ACTTGATTGG TTAGTCAAGC GAAGAGCGAA
-----
      Aval
-----
4601 CTGTTGCGGC GCTTCTGCTC CCCGAGCTCA ATAAAGAGC CCACAACCCC
      GACAAAGCGCG CGAAGACGAG GGGCTCGAGT TATTTTCTCG GGTGTTGGGG
-----
```

79/85

SUBSTITUTE SHEET (RULE 26)

Fig. 20-12

```

XmaI
~~~~~
SmaI
~~~~~
AvaI
~~~~~
AvaI
~~~~~
4651 TCACTCGGG CGCCAGTCCT CCGATTGACT GAGTCGCCG GGTACCCGTG
    AGTGAGCCCC GCGGTCAGGA GGCTAACTGA CTCAGCGGGC CCATGGGCAC
-----
4701 TATCCAATAA ACCCTCTTGC AGTTGCATCC GACTTGTGGT CTCGCTGTTT
    ATAGGTTATT TGGGAGAACG TCAACGTAGG CTGAACACCA GAGCGACAAG
-----
4751 CTTTGGAGGG TCTCCTCTGA GTGATTGACT ACCCGTCAGC GGGGTCCTTT
    GAACCTCTCC AGAGGAGACT CACTAACTGA TGGGCAGTCG CCCCCAGAAA
-----
4801 CATTGGGGG CTCGTCCGGG ATCGGGAGAC CCCTGCCCCAG GGACCACCGA
    GTAAACCCCC GAGCAGGCC TAGCCCTCTG GGGACGGGTC CCTGGTGGCT
-----
4851 CCCACCACCG GGAGGTAAGC TGGCTGCCTC GCGCGTTTCG GTGATGACGG
    GGGTGGTGGC COTCCATTTC ACCGACGGAG CCGGCAAAGC CACTACTGCC
-----
4901 TGAAACCTC TGACACATGC AGCTCCCGGA GACGGTCACA GCTTGTCTGT
    ACTTTTGGAG ACTGTGTACG TCGAGGGCCT CTGCCAGTGT CGAACAGACA
-----
4951 AAGCGGATGC CGGGAGCAGA CAAGCCCGTC AGGGCGCGTC AGCGGTGTT
    TTCGCCTACG GCCCTCGTCT GTTCGGGCAG TCCCCGCGCAG TCGCCACAA
-----
5001 GCGGGGTGTC GGGGCGCAGC CATGACCCAG TCACGTAGCG ATAGCGGAGT
    CCGCCACACG CCGCGCGTCG GTACTGGGTC AGTGCATCGC TATCGCCTCA
-----

```



## ApaLI

~~~~~

5051 GTATACTGGC TTAACATATGC GGCATCAGAG CAGATTGTAC TGAGAGTGCA  
 CATATGACCG AATTGATACG CCGTAGTCTC GTCTAACATG ACTCTCACGT

## ApaLI

5101 CCATATGCGG TGTGAAATAC CGCACAGATG CGTAAGGAGA AAATACCGCA  
 GGTATACGCC ACACTTTATG GCGTGTCTAC GCATTCTCTT TTTATGGCGT

5151 TCAGGCGGTC TTCCGCTTCC TCGCTCACTG ACTCGCTGCG CTCGGTCGTT  
 AGTCCGCGAG AAGCGAAGG AGCGAGTGAC TGAGCGACGC GAGCCAGCAA

5201 CGGCTGCGGC GAGCGGTATC AGCTCACTCA AAGCGGTAA TACGGTTATC  
 GCCGACGCCG CTCGCCATAG TCGAGTGAGT TTCCGCCATT ATGCCAATAG

5251 CACAGAAATCA GGGATAACG CAGGAAAGAA CATGTGAGCA AAAGGCCAGC  
 GTGTCTTAGT CCCCTATTGC GTCCTTCTT GTACACTCGT TTTCCGGTCG

5301 AAAAGGCCAG GAACCGTAA AAGCGCGGT TGCTGGCGTT TTTCCATAGG  
 TTTTCCGGTC CTTGGCAATT TTCCGGCGCA ACGACCGCAA AAAGGTATCC

5351 CTCGCCCCC CTGACGAGCA TCACAAAAT CGACGCTCAA GTCAGAGGTG  
 GAGGCGGGG GACTGCTCGT AGTGTTTTTA GCTGCGAGTT CAGTCTCCAC

5401 GCGAAACCCG ACAGGACTAT AAAGATACCA GCGTTTCCC CCTGGAAGCT  
 CGCTTTGGGC TGTCCTGATA TTTCTATGGT CCGCAAAGG GGACCTTCGA

Fig. 20-14

5451 CCCTCGTGCG CTCTCCTGTT CCGACCCCTGC CGCTTACCGG ATACCTGTCC  
GGGAGCACGC GAGAGGACAA GGCTGGGACG GCGAATGGCC TATGGACAGG  
-----  
5501 GCCTTTCTCC CTTCGGGAAG CGTGGCGCTT TCTCATAGCT CACGCTGTAG  
CGGAAAGAGG GAAGCCCTTC GCACCGCGAA AGAGTATCGA GTGCGACATC  
-----  
-----  
5551 GTATCTCAGT TCGGTGTAGG TCGTTCGCTC CAAGCTGGG TGTGTGCACG  
CATAGAGTCA AGCCACATCC AGCAAGCGAG GTTCGACCCG ACACACGTGC  
-----  
5601 AACCCCCCGT TCAGCCCGAC CGCTGCGCTT TATCCGGTAA CTATCGTCTT  
TTGGGGGGCA AGTCGGGCTG GCGACGCGGA ATAGGCCATT GATAGCAGAA  
-----  
5651 GAGTCCAACC CGGTAAGACA CGACTTATCG CCACTGGCAG CAGCCACTGG  
CTCAGGTTGG GCCATTCTGT GCTGAATAGC GGTGACCGTC GTCGGTGACC  
-----  
5701 TAACAGGATT AGCAGAGCGA GGTATGTAGG CGGTGCTACA GAGTTCTTGA  
ATTGTCCCTAA TCGTCTCGCT CCATACATCC GCCACGATGT CTCAGAAGAACT  
-----  
5751 AGTGGTGGCC TAACTACGGC TACACTAGAA GGACAGTATT TGGTATCTGC  
TCACCACCGG ATTGATGCCG ATGTGATCTT CCTGTCTATA ACCATAGACG  
-----  
5801 GCTCTGCTGA AGCCAGTTAC CTTCCGAAAA AGAGTTGGTA GCTCTTGATC  
CGAGACGACT TCGGTCAATG GAAGCCTTTT TCTCAACCAT CGAGAACTAG  
-----  
5851 CGGCAACAA ACCACCGCTG GTAGCGGTGG TTTTTTTGTT TGCAAGCAGC  
GCCGTTTGT TGGTGGCGAC CATCGCCACC AAAAAACAA ACGTTCGTCG  
-----

ApaLI  
~~~~~

5901 AGATTACGCG CAGAAAAAAA GGATCTCAAG AAGATCCTTT GATCTTTTCT  
TCTAATGCGC GTCTTTTTTT CCTAGAGTTC TTCTAGGAAA CTAGAAAAAGA  
-----  
5951 ACGGGGTCTG ACGTCTAGTG GAAAGGAAAC TCACGTTAAG GGATTTTGGT  
TGCCCCCAGAC TGGGAGTCAC CTTGCTTTTG AGTGAATTC CCTAAAAACCA  
-----  
6001 CATGAGATTA TCAAAAAAGGA TCTTCACCTA GATCCTTTTA AATTAAAAAT  
GTACTCTAAT AGTTTTTCCT AGAAGTGGAT CTAGGAAAAAT TTAATTTTAA  
-----  
6051 GAAAGTTTAA ATCAATCTAA AGTATATATG AGTAAACTTG GTCIGACAGT  
CTTCAAAAATT TAGTTAGATT TCATATATAC TCATTTGAAC CAGACTGTCA  
-----  
6101 TACCAATGCT TAATCAGTGA GGCACCTATC TCAGCGATCT GTCTATTTCG  
ATGGTTACGA ATTAGTCACT CCGTGGATAG AGTCGCTAGA CAGATAAAGC  
-----  
6151 TTCATCCATA GTTGCCCTGAC TCCCCGTCGT GTAGATAACT ACGATACGGG  
AAGTAGGTAT CAACGGACTG AGGGGCAGCA CATCTATTGA TGCTATGCCC  
-----  
6201 AGGGCTTACC ATCTGGCCCC AGTGCTGCAA TGATACCGCG AGACCCACGC  
TCCCCGAATGG TAGACCGGGG TCACGACGTT ACTATGGCGC TCTGGGTGCG  
-----  
6251 TCACCGGCTC CAGATTATTATC AGCAATAAAC CAGCCAGCCG GAAGGGCCGA  
AGTGGCCCGAG GTCTAAATAG TCGTTATTTG GTCGGTCGGC CTTCCCCGCT  
-----  
6301 GCGCAGAAGT GGTCCTGCAA CTTTATCCGC CTCCATCCAG TCTATTAAAT  
CGCGTCTTCA CCAGGACGTT GAAATAGGCG GAGGTAGGTC AGATAATTAA  
-----

```

6351 GTTGCCGGGA AGCTAGAGTA AGTAGTTCG CAGTTAATAG TTTGGCGAAC
    CAACGGCCCT TCGATCTCAT TCATCAAGCG GTCAATTATC AAACGCGTTG
-----
                                PstI
                                ~~~~~
6401 GTTGTGCCA TTGCTGCAGG CATCGTGGTG TCACGCTCGT CGTTTGGTAT
    CAACAAACGGT AACGACGTCC GTAGCACCAC AGTGGGAGCA GCAAAACCATA
-----
6451 GGCTTCATTC AGTCCGGTT CCCAACGATC AAGCGAGTT ACATGATCCC
    CCGAAGTAAG TCGAGGCCAA GGGTTGCTAG TTCCGCTCAA TGTACTAGGG
-----
6501 CCATGTTGTG CAAAAAAGCG GTTAGCTCCT TCGGTCCTCC GATCGTTGTC
    GGTACAACAC GTTTTTCGCG CAATCGAGGA AGCCAGGAGG CTAGCAACAG
-----
6551 AGAAGTAAGT TGGCCGCAGT GTTATCACTC ATGGTTATGG CAGCACTGCA
    TCTTCATTCA ACCGGCGTCA CAATAGTGAG TACCAATACC GTCGTGACGT
-----
6601 TAATTCTCTT ACTGTCAATG CATCCGTAAG ATGCTTTTCT GTGACTGGTG
    ATTAAGAGAA TGACAGTACG GTAGGCATTC TACGAAAAGA CACTGACCAC
-----
6651 AGTACTCAAC CAAGTCATTC TGAGAATAGT GTATGCGCG ACCGAGTTGC
    TCATGAGTTG GTTCAGTAAG ACTCTTATCA CATACGCCGC TGGCTCAACG
-----
6701 TCTTGCCCGG CGTCAACACG GGATAATACC GCGCCACATA GCAGAACTTT
    AGAACGGGCC GCAGTTGTGC CCTATTATGG CGCGGTGTAT CGTCTTGAAA
-----
6751 AAAAGTGCTC ATCATTTGGA AACGTTCTTC GGGCGGAAA CTCTCAAGGA
    TTTTCACGAG TAGTAACCTT TTGCAAGAAG CCCCCTTTT GAGAGTTTCT
-----

```

## ApaLI

6801 TCTTACCGCT GTTGAGATCC AGTTCGATGT AACCCACTCG TGCACCCAAAC  
AGAAATGGCGA CAACTCTAGG TCAAGCTACA TTGGGTGAGC ACGTGGGTG  
-----  
6851 TGATCTTCAG CATCTTTTAC TTTCACCAGC GTTCTGGGT GAGCAAAAAC  
ACTAGAAATC GTAGAAAATG AAAGTGGTCG CAAAGACCCA CTCGTTTTTG  
-----  
6901 AGGAAGGCAA AATGCCGCAA AAAAGGGAAT AAGGGCGACA CGGAAATGTT  
TCCTTCCGTT TTACGGCGTT TTTTCCCTTA TTCCCGCTGT GCCTTTACAA  
-----  
6951 GAATACTCAT ACTCTTCCCT TTTCAATATT ATTGAAGCAT TTATCAGGGT  
CTTATGAGTA TGAGAAAGGAA AAGTTATATA TAACTTCGTA AATAGTCCCA  
-----  
7001 TATTGTCTCA TGAGCGGATA CATATTGAA TGTATTTAGA AAAATAAACA  
ATAACAGAGT ACTCGCCTAT GTATAAACTT ACATAAATCT TTTTATTTGT  
-----  
7051 AATAGGGGTT CCGCGCACAT TTCCCGGAAA AGTGCCACCT GACGTCTAAG  
TTATCCCCAA GCGCGGTGTA AAGGGGCTTT TCACGGTGA CTGCAGATTC  
-----  
7101 AAACCATTA TATCATGACA TTAACCTATA AAAATAGGCG TATCACCAGG  
TTTGGTAATA ATAGTACTGT AATTGGATAT TTTTATCCGC ATAGTGCTCC  
-----  
7151 CCCTTTCGTC TTCAA  
GGGAAAGCAG AAGTT  
-----

85/85

SUBSTITUTE SHEET (RULE 26)

Fig. 20-18

## SEQUENCE LISTING

<110> Human Gene Therapy research Institute

5 <120> Nucleotide Expression Systems with Reduced  
Immunogenicity

<130> immune suppression vector

10 <140>

<141>

<150> 60/071,409

<151> 1998-01-14

15

<160> 5

<170> PatentIn Ver. 2.0

20 <210> 1

<211> 6141

<212> DNA

<213> Artificial Sequence

25 <220>

<223> Description of Artificial Sequence : recombinant  
vector

<220>

30 <223> Description of Artificial Sequence : recombinant  
vector

<400> 1

gaattgctag caattgctag caattgctag caattcatac cagatcaccg aaaactgtcc 60  
35 tccaaatgtg tcccctcac actcccaaat tcgcgggctt ctgcctctta gaccactcta 120  
ccctattccc cacactcacc ggagccaaag ccgcggccct tccgtttctt tgcttttgaa 180  
agacccacc cgtaggtggc aagctagctt aagtaacgcc acttgcaag gcatggaaaa 240

atacataact gagaatagaa aagttcagat caaggtcagg aacaaagaaa cagctgaata 300  
 ccaaacagga tatctgtgtt aagcggttcc tgccccggct cagggccaag aacagatgag 360  
 acagctgagt gatgggccaac acaggatatac tgtggttaagc agttcctgcc ccggctcggg 420  
 gccaaagaaca gatgggtccc agatgcggtc cagccctcag cagtttctag tgaatcatca 480  
 5 gatgtttcca ggggtcccca aggacctgaa aatgacctg taccttattt gaactaacca 540  
 atcagttcgc ttctcgttc tgttcgcgcg ctccgctct cagagctcaa taaaagagcc 600  
 cacaacctc cactcggcgc gccagtcttc cगतagactg cgtcggccgg gtaccgctat 660  
 tcccaataaa gcctcttgtt gtttgcatcc gaatcgttgt ctcgtgttc cttgggaggg 720  
 tctccttga gtgattgact accacgacg ggggtctttc atttgggggc tctccggga 780  
 10 tttggagacc cctgcccagg gaccaccgac ccaccaccgg gaggttaagct ggccagcaac 840  
 ttatctgtgt cgtccgatt gctagtgtc tatgtttgat gttatgcgc tcgctctgta 900  
 ctagttagct aactagctct gtatctggcg gaccctgggt ggaactgacg agttctgaac 960  
 acccgccgc aacctggga gactcccag ggactttggg ggccgtttt gtggcccgac 1020  
 ctgaggaagg gactgatgt ggaatccgac cccgtcagga tatgtgttc tggtaggaga 1080  
 15 cgagaacctt aaacagttcc cgcctccgc tgaattttg ctttcggtt ggaaccgaag 1140  
 ccgcgcgtct tgtctgtgc agcgtgcag catcgttctg tgtgtctct gctgactgt 1200  
 gtttctgtat ttgtctgaaa attagggcca gactgttacc actccctaa gttgacctt 1260  
 aggtcactgg aaagatgtc agcggatgc tcacaaccag tcgtagatg tcaagaagag 1320  
 acgttgggtt accttctgt ctcgagaatg gccaacctt aacgtcggat ggccgcgaga 1380  
 20 cggcacctt aaccgagacc tcatcacca ggttaagatc aaggtcttt cacttggcc 1440  
 gcatggacac ccagaccagg tccctacat cgtgacctg gaagccttg ctttgacct 1500  
 cctccctgg gtcaagcct ttgtacacc taagcctcg cctccttc ctccatccg 1560  
 cccgtctc cccctgaac ctctcgttc gaccccgct cगतctccc tttatccag 1620  
 cctcactct tctctaggcg ccgtagtgc tggccctgg aatggcgga cacttctg 1680  
 25 gacaccatgc gggttggcc caggacgtac gccgacgtac gcgatgagat caataaaagg 1740  
 gggcgtgagg accgggaggc ggccagaacc gccgtgcag acccgagcg tccctgctg 1800  
 cgctctccc ggctgtgcc cgaaatccc cccaacgcat cttgggtgt ggcacatga 1860  
 agaaccggcg ggacctgac cgacgtccc cgtaatccg taaccgttg aaattcgta 1920  
 actcgaggat ccggctgtgg aatgtgtgc agttagggtg tggaaagtc ccaggctccc 1980  
 30 cagcaggcag aagtatgcaa agcatgcat tcaattagtc agcaaccagg tgtggaaagt 2040  
 cccaggctc cccagcaggc agaagtatgc aaagcatgca tctcaattag tcagcaacca 2100  
 tagtcccccc cctaactcg cccatccgc cctaactcc gccagttcc gccattctc 2160  
 cgccccatgg ctgactaatt tttttattt atgcagaggc caggccgcc tcggcctctg 2220  
 agctattcca gaagtagtga ggaggcttt ttggaggcct aggttttgc aaaaagctt 2280  
 35 ggctgcaggt cgaggcggat ctgatcaaga gacaggatga gcatcgttc gcatgattga 2340  
 acaagatgga ttgcacgag gttctccgc cgttgggtg gagaggctat tcggctatga 2400  
 ctgggcacaa cagacaatcg gctgctctga tgccgcgtg ttccggctgt cagcgaggg 2460

gcgcccgggt cttttgtca agaccgacct gtccgggtgcc ctgaatgaac tgcaggacga 2520  
 ggcagcgcgg ctatcgtggc tggccacgac gggcggttct tgcgcagctg tgctcgacgt 2580  
 tgtcactgaa gcgggaaggg actggctgct attgggcgaa gtgccggggc aggatctcct 2640  
 gtcattcac cttgctcctg ccgagaaaagt atccatcatg gctgatgcaa tgcggcggt 2700  
 5 gcatacgctt gatccggcta cctgccatt cgaccaccaa gcgaacatc gcatcgagcg 2760  
 agcacgtact cggatggaag ccggtcttgt cgatcaggat gatctggacg aagagcatca 2820  
 ggggctcgcg ccagccgaac tgttcgccag gctcaaggcg cgcagcccg acggcgagga 2880  
 tctcgtcgtg acccatggcg atgcctgctt gccgaatata atggtggaat atggccgctt 2940  
 ttctggattc atcactgtg gccggctggg tgtggcggac cgctatcagg acatagcgtt 3000  
 10 ggctaccgt gatattgctg aagagcttgg cggcgaaatgg gctgaccgt tctcgtgct 3060  
 ttacggtatc gccgctccg attcgacg cgatgccttc tatgccttc ttgacgagtt 3120  
 cttctgagcg ggactctggg gttcgataaa ataaaagatt ttatttagtc tccagaaaaa 3180  
 ggggggaatg aaagaccca cctgtagggt tggcaagcta gcttaagtaa cgcattttg 3240  
 caaggcatgg aaaaatacat aactgagaat agagaagttc agatcaaggt caggaacaga 3300  
 15 tggaacagct gaatatgggc caaacaggat atctgtgga agcagttct gccccggctc 3360  
 agggccaaga acagatggaa cagctgaata tgggccaac aggatatctg tgtaagcag 3420  
 ttctgccc ggctcaggcg caagaacaga tggccccag atcggtcca gccctcagca 3480  
 gtttctagag aaccatcaga tgttccagg gtgccccag gacctgaat gacctgtgc 3540  
 cttattttaa ctaaccaatc agtgccttc tgccttctg tgcgcgctt ctgctccc 3600  
 20 agctcaataa aagagccac aaccctcac tggggcgcc agtctccga ttgactgagt 3660  
 cgccccgta cccgtgtatc caataaacc tcttcagtt gcatccgact tgggtctcg 3720  
 ctgttcttg ggagggtct ctctgagtga ttgactacc gtcagcggg gttttcatt 3780  
 tgggggctcg tccggatcg ggagaccct gccaggac caccgacca ccaccgggag 3840  
 gtaagctggc tgcctcgcg gtttcggtga tgacggtgaa aacctctgac acatgcagct 3900  
 25 cccggagacg gtcacagctt gtctgtaagc ggatgccgg agcagacaag cccgtcaggg 3960  
 cgcgtcagcg ggtgttggcg ggtgtcgggg cgcagccatg acccagtcac gtagcatag 4020  
 cggagtgtat actggcttaa ctatcgcca tcagagcaga ttgtactgag agtcacat 4080  
 atgcggtgtg aaataccgca cagatgcgta aggagaaaat accgcatcag gcgctcttc 4140  
 gcttctcgc tactgactc gctgcgctg gtcgttcggc tgcggcgagc ggtatcagct 4200  
 30 cactcaaagg cgtaatacg gttatccaca gaatcagggg ataacgcagg aaagaacatg 4260  
 tgagcaaaag gccagcaaaa gccaggaac cgtaaaaagg ccgcttctg ggcgttttc 4320  
 cataggctcc gccccctga cgagcatcac aaaaatcgac gctcaagta gaggtggcga 4380  
 aacccgacag gactataaag ataccaggcg tttccccctg gaagtcctt cgtgcgtct 4440  
 cctgttcca cctgcgct taccggatc ctgtccgct ttctccctc gggaagcgtg 4500  
 35 gcgcttctc atagtcacg ctgtaggat ctgagtcgg ttaggtcgt tgcctcaag 4560  
 ctgggctgtg tgcacgaac cccggtcag ccgaccgct gcgcttata cgtaactat 4620  
 cgtctttagt ccaacccggt aagacacgac ttatgccac tggcagcagc cactggtaac 4680



aggattagca gagcgaggta tgtaggcggt gctacagagt tcttgaagtg gtggcctaac 4740  
 tacggctaca ctagaaggac agtatttgggt atctgcgctc tgctgaagcc agttaccttc 4800  
 ggaaaaagag ttggtagctc ttgatccggc aaacaaacca ccgctggtag cggtgggttt 4860  
 ttgtttgca agcagcagat tacgcgcaga aaaaaaggat ctcaagaaga tcctttgatc 4920  
 5 tttttacgg ggtctgacgc tcagtggaac gaaaactcac gttaagggtat tttggtcatg 4980  
 agattatcaa aaaggatctt cacctagatc cttttaaatt aaaaatgaag ttttaaatca 5040  
 atctaaagta tatatgagta aacttggtct gacagttacc aatgcttaat cagtgaggca 5100  
 cctatctcag cgatctgtct atttcgttca tccatagttg cctgactccc cgtcgtgtag 5160  
 ataactacga tacgggaggg cttaccatct ggccccagtg ctgcaatgat accgcgagac 5220  
 10 ccacgtcac cggtccaga tttatcagca ataaaccagc cagccggaag ggccgagcgc 5280  
 agaagtggtc ctgcaacttt atccgcctcc atccagtcta ttaattgttg ccgggaagct 5340  
 agagtaagta gttcgccagt taatagtttg cgcaacgttg ttgccattgc tgcaggcatc 5400  
 gtggtgtcac gctcgtcgtt tggtaggtct tcattcagct ccggttccca acgatcaagg 5460  
 cgagttacat gatcccccat gttgtgcaaa aaagcgggta gctccttcgg tcctccgatc 5520  
 15 gttgtcagaa gtaagttggc cgcagtggtta tcaactcatgg ttatggcagc actgcataat 5580  
 tctcttactg tcatgccatc cgtaagatgc ttttctgtga ctggtgagta ctcaaccaag 5640  
 tcattctgag aatagtgtat gcggcgaccg agttgctctt gcccggcgtc aacacgggat 5700  
 aataccgcgc cacatagcag aactttaaaa gtgctcatca ttggaaaacg ttcttcgggg 5760  
 cgaaaactct caaggatctt accgctgttg agatccagtt cgatgtaacc cactcgtgca 5820  
 20 cccaactgat cttcagcatc ttttacttcc accagcgttt ctgggtgagc aaaaacagga 5880  
 aggcaaaatg ccgcaaaaaa gggaataagg gcgacacgga aatgttgaat actcatactc 5940  
 ttccttttcc aatattattg aagcatttat cagggttatt gtctcatgag cggatacata 6000  
 tttgaatgta tttagaaaaa taaacaaata ggggttccgc gcacatttcc ccgaaaagtg 6060  
 ccacctgacg tctaagaaac cattattatc atgacattaa cctataaaaa taggcgtatc 6120  
 25 acgaggccct ttcgtcttca a 6141

&lt;210&gt; 2

&lt;211&gt; 6522

&lt;212&gt; DNA

30 &lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence : recombinant  
 vector

35

&lt;400&gt; 2

gaattgctag caattgctag caattgctag caattcatac cagatcaccg aaaactgtcc 60

tccaaatgtg tccccctcac actcccaaact tcgcgggctt ctgcctctta gaccactcta 120  
 ccctattccc cacactcacc ggagccaaag ccgcggccct tccgtttctt tgcttttgaa 180  
 agaccccacc cgtaggtggc aagctagctt aagtaacgcc actttgcaag gcatggaaaa 240  
 atacataact gagaatagaa aagttcagat caaggtcagg aacaaagaaa cagctgaata 300  
 5 ccaaacagga tatctgtgtt aagcgggtcc tgccccggct cagggccaag aacagatgag 360  
 acagctgagt gatgggccaa acaggatatac tgttgtaagc agttcctgcc ccggctcggg 420  
 gccagaaca gatgggtccc agatgcggtc cagccctcag cagtttctag tgaatcatca 480  
 gatgtttcca ggggtcccca aggacctgaa aatgacctg taccttattt gaactaacca 540  
 atcagttcgc ttctcgttc tgttcgcgcg ctccgctct cagagctcaa taaaagagcc 600  
 10 cacaacctt cactcggcgc gccagtcttc ctagactg cgtcggccgg gtaccgtat 660  
 tcccaataaa gctcttctt gtttgcattc gaactgtgtt ctgcgttc cttgggaggg 720  
 tctcctctga gtgattgact acccacgacg ggggtcttct atttgggggc tcgtccggga 780  
 tttggagacc cctgcccagg gaccacgac ccaccaccgg gaggttaagct ggccagcaac 840  
 ttatctgtgt ctgtccgatt gtctagtgtc tatgtttgat gttatgcgc tcgctctgta 900  
 15 ctagttagct aactagctct gtatctggcg gacctgtgtt ggaactgacg agttctgaac 960  
 accggccgc aacctggga gacgtcccag ggactttggg ggccgtttt gtggcccgac 1020  
 ctgaggaagg gactgatgt ggaatccgac ccgtcagga tatgtggtc tggtaggaga 1080  
 cgagaacctt aaacagttcc cgcctccgtc tgaattttg ctttcggtt ggaaccgaag 1140  
 ccgcgcgtt tctctgtgc agcgtgcag catcgttctg tgttctct ctctgactgt 1200  
 20 gtttctgtat ttgtctgaaa attagggcca gactgttacc actccctaa gttgacctt 1260  
 aggtcactgg aaagatgtcg agcggatgc tcacaaccag tcggtagatg tcaagaagag 1320  
 acgttgggtt acctctctct ctgcagaatg gccaaacctt aacgtcggat ggccgcgaga 1380  
 cggcacctt aaccgagacc tcatcaccca ggttaagatc aaggtcttt cacctggccc 1440  
 gcatggacac ccagaccagg tccctacat cgtgacctg gaagccttg cttttgacct 1500  
 25 cctccctgg gtaagccct ttgtacacc taagcctcg cctcctctc ctcacccg 1560  
 cccgtctct cccctgaac ctctcgttc gacctcct cgatectccc ttatccagc 1620  
 cctcactct tctctaggcg ccggtgaac cttgtaatgc ttattctagc cctctgggc 1680  
 ccggtcgcgg gtagtatgcc tgaattatc ttgactctt tcgatgaacc tccgccctg 1740  
 gtggagacgg agcgttacc gcctctgtcc gatgttctg agtaccgagt agagtattcc 1800  
 30 gaggcgcgt gcgtgctccg atcggggcgt cgaactggag ctctgtggac cctgcgcggg 1860  
 aacctgtccg tgcccagcc gacaccccg gtgtactacc agacgtgga gggctacgcg 1920  
 gatcgagtgc cgacgcgggt ggaggacgtc tccgaaagcc tcgtcgaaa acgtactgg 1980  
 ctccgggact atcgtgttc ccaacgcaca aaactcgtg tgttctact tccccctgc 2040  
 caccaatgcc aaacttatta ttagagtgc gaaccccggt gcctcgtgc ttgggttccc 2100  
 35 ctgtggagct cgtagagga catcgaacga ctattgttcg aagatgcgcg tctaattggc 2160  
 tactacgcgc tcacgattaa gtcggcgag tatacgtga tgatggggc agtgattcaa 2220  
 gtgttttggg ggctgtatgt gaaaggttg ctgcaccgac atttccctg gatgttttcg 2280

gaccagtgtt gaaattcgtt aactcgagga tccggctgtg gaatgtgtgt cagttaggtt 2340  
 gtggaaagtc cccaggctcc ccagcaggca gaagtatgca aagcatgcat ctcaattagt 2400  
 cagcaaccag gtgtggaaag tcccaggct cccagcagg cagaagtatg caaagcatgc 2460  
 atctcaatta gtcagcaacc atagtccgc cctaactcc gccatcccg ccctaactc 2520  
 5 cgcccgatgc cgccattct ccgcccctg gctgactaat ttttttatt tatgcagagg 2580  
 ccgaggccgc ctggcctct gagctattcc agaagtagtg aggaggcttt ttggaggcc 2640  
 taggttttg caaaaagctt gggctgcagg tgcaggcgga tctgatcaag agacaggatg 2700  
 aggatcgttt cgcatgattg aacaagatgg attgcacgca ggttctccg ccgcttgggt 2760  
 ggagaggcta ttggctatg actgggcaca acagacaatc ggctgctctg atgccgccgt 2820  
 10 gttccggctg tcagcgcagg ggcgcccggt tcttttctc aagaccgacc tgcgggtgc 2880  
 cctgaatgaa ctgcaggacg aggcagcgcg gctatcgttg ctggccacga cggcgcttc 2940  
 ttgcgcagct gtgctcagc ttgtcactga agcgggaagg gactggctgc tattggcgca 3000  
 agtgccgggg caggatctcc tgtcatctca ccttgcctc gccgagaaag tatccatcat 3060  
 ggctgatgca atgcggcggc tgcatacgtt tgatccggt accgcccac tcgaccacca 3120  
 15 agcgaaacat cgcacgcagc gagcacgtac tcggatggaa gccggtcttg tcgatcagga 3180  
 tgatctggac gaagagcatc aggggctcgc gccagccgaa ctgttcgcca ggctcaaggc 3240  
 gcgcagccc gacggcgagg atctcgtctg gaccatggc gatgcctgtg tgccgaatat 3300  
 catggtggaa aatggccgct tttctggatt catcgactgt ggccggctgg gtgtggcgga 3360  
 ccgctatcag gacatagcgt tggctaccg tgatattgct gaagagcttg gcggcgaatg 3420  
 20 ggctgaccgc ttctcgtgc ttacgggtat cgcgctccc gattcgcagc gcacgcctt 3480  
 ctatgcctt ctgacagat tctctgagc gggactctgg ggttcgataa aataaaagat 3540  
 tttattagt ctccagaaaa aggggggaat gaaagacccc acctgtaggt ttggcaagct 3600  
 agcttaagta acgccatttt gcaaggcatg gaaaaataca taactgagaa tagagaagtt 3660  
 cagatcaagg tcaggaacag atggaacagc tgaatatggg ccaaacagga tatctgtgtg 3720  
 25 aagcagttcc tgccccggt caggccaag aacagatgga acagctgaat atgggcaaaa 3780  
 caggatatct gtgtaagca gttctgccc cggctcagg ccaagaacag atggtcccca 3840  
 gatcgggtcc agccctcagc agtttctaga gaaccatcag atgtttccag ggtgccccaa 3900  
 ggacctgaaa tgaccctgtg ctttatttga actaaccaat cagttcgtt ctcgctctg 3960  
 ttgcgcgct tctgctccc gagctcaata aaagagccca caacctca ctcggggcgc 4020  
 30 cagtctccg attgactgag tcgcccgggt acccgtgtat ccaataaacc ctcttcagat 4080  
 tgcacccgac ttgtgtctc gctgttcctt gggagggctt cctctgagt attgactacc 4140  
 cgtcagcggg ggtctttcat ttgggggctc gtccgggatc gggagacccc tgcccaggga 4200  
 ccaccgacc accaccggga ggtaagctgg ctgcctcgcg cgttcgggtg atgacggtga 4260  
 aaaccttga cacatgcagc tcccggagac ggtcacagct tgtctgtaag cgatgccgg 4320  
 35 gagcagacaa gccctcagg gcgcgtcagc ggggtgttgc ggggtcggg gcgcagccat 4380  
 gaccagtcga cgtagcgata gcggagtga tactggctta actatcgggc atcagagcag 4440  
 attgtactga gagtgcacca tatgcggtgt gaaataccgc acagatgcgt aaggagaaaa 4500

taccgcatca ggcgctcttc cgcttctctg ctactgact cgctgcgtc ggtcgttcgg 4560  
 ctgcggcgag cggatcagc tcactcaag gcggaatac ggtatccac agaatacagg 4620  
 gataacgcag gaaagaacat gtgagcaaaa ggccagcaaa aggccaggaa ccgtaaaaag 4680  
 gccgcgttgc tggcgttttt ccataggctc cgccccctg acgagcatca caaaaatcga 4740  
 5 cgctcaagtc agaggtggcg aaaccgaca ggactataaa gataccaggc gttccccct 4800  
 ggaagctccc tcgtgcgtc tctgttccg accctgcgc ttaccggata cctgtccgc 4860  
 ttctccctt cgggaagcgt ggcgctttct catagctcac gctgtaggta tctcagttcg 4920  
 gtgtaggctg ttcgtccaa gctgggtgt gtgcacgaac ccccggtca gccgcacgc 4980  
 tgcgccttat ccgtaacta tcgtctttag tccaaccgg taagacacga cttatcgcca 5040  
 10 ctggcagcag cactggtaa caggattagc agagcgaggt atgtaggcgg tgctacagag 5100  
 ttctgaagt ggtggcctaa ctacggctac actagaagga cagtatttgg tatctgcgt 5160  
 ctgctgaagc cagttacctt cggaaaaaga gttgtagct ctgatccgg caaacaacc 5220  
 accgctgcta gccgtggttt tttgtttgc aagcagcaga ttacgcgcag aaaaaagga 5280  
 tctcaagaag atcctttgat cttttctac gggtctgacg ctacgtggaa cgaaaactca 5340  
 15 cgtaaggga ttttggcat gagattatca aaaaggatct tcacttagat ctttttaaat 5400  
 taanaatgaa gtttaaatc aatctaaagt atatagagt aaacttggtc tgacagttac 5460  
 caatgcttaa tcagtgggc acctatctca gcgctctgc tatttcgtc atccatagt 5520  
 gcctgactcc ccgtcgtga gataactag atacgggagg gcttaccatc tggccccagt 5580  
 gctgcaatga taccgcgaga cccagctca ccggtccag atttatcagc aataaaccag 5640  
 20 ccagccggaa gggccgagcg cagaagtgt cctgcaactt tatccgctc catccagtct 5700  
 attaattgtt gccgggaagc tagagtaagt agtcgcccag ttaatagttt gcgcaacgtt 5760  
 gttgccattg ctgcaggcat cgtggtgtca cgctcgtcgt ttggtatggc ttcattcagc 5820  
 tccggttccc aacgatcaag gcgagttaca tgatcccca tgtgtgcaa aaaagcgtt 5880  
 agctccttcg gtctccgat cgtgtcaga agtaagttgg ccgcagtgtt atcactcatg 5940  
 25 gttatggcag cactgcataa ttctttact gtcatgcat ccgtaagatg cttttctgtg 6000  
 actggtgagt actcaacaa gtcattctga gaatagtga tgcggcgacc gagttgctct 6060  
 tgccccggt caacacggga taataccgc ccacatagca gaactttaa agtgctcatc 6120  
 attgaaaaac gtttctcgg gcgaaaactc tcaaggatct taccgctgtt gagatccagt 6180  
 tcatgtaac ccatcgtgc acccaactga tcttcagcat cttttactt caccagcgtt 6240  
 30 tctgggtgag caaaaacagg aaggcaaat gccgcaaaa aggaataag ggcgacagg 6300  
 aaatgttgaa tactcatact ctctctttt caatattatt gaagcattta tcagggttat 6360  
 tgtctcatga gcggatacat attgaaatg atttagaaaa ataaacaaat aggggttccg 6420  
 cgcacatttc ccgaaaagt gccacctgac gtctaagaaa ccattattat catgacatta 6480  
 acctataaaa ataggcgtat cagaggccc ttcgtcttc aa 6522  
 35

<210> 3  
 <211> 7165

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

- 5 <223> Description of Artificial Sequence : recombinant  
vector

&lt;400&gt; 3

gaattgctag caattgctag caattgctag caattcatac cagatcaccg aaaactgtcc 60  
 10 tccaaatgtg tccccctcac actcccaaact tcgcgggctt ctgcctctta gaccactcta 120  
 ccctattccc cacactcacc ggagccaaag ccgcgccct tccgtttctt tgcctttgaa 180  
 agacccccacc cgtaggtggc aagctagctt aagtaacgcc actttgcaag gcatggaaaa 240  
 atacataact gagaatagaa aagttcagat caaggtcagg aacaaagaaa cagctgaata 300  
 ccaaacagga tatctgtggt aagcgggttc tccccggct cagggccaag aacagatgag 360  
 15 acagctgagt gatgggccaac acaggatatac tgtggttaagc agttcctgcc ccggctcggg 420  
 gccaaagaaca gatgtcccc agatcgggtc cagccctcag cagtttctag tgaatcatca 480  
 gatgtttcca ggggtcccca aggacctgaa aatgacctg taccttattt gaactaacca 540  
 atcagttcgc ttctcgttc tgttcgcgcg ctccgctct ccgagctcaa taaaagagcc 600  
 cacaacccct cactcggcgc gccagtcttc ctagactcgc cgtcgcggg gtaccgctat 660  
 20 tcccaataaa gcctcttctg gtttgcattc gaatcgtggt ctgcgtgttc cttgggaggg 720  
 tctcctctga gtgattgact acccacgacg ggggtcttcc atttgggggc tcgtccggga 780  
 tttggagacc cctgccagg gaccaccgac ccaccaccg gaggttaagct ggccagcaac 840  
 ttatctgtgt ctgtccgatt gtctagtgtc tatgtttgat gttatgcgc tgcgtctgta 900  
 ctagttagct aactagctct gtatctggcg gaccgtggt ggaactgacg agttctgaac 960  
 25 acccgccgc aacctggga gacgtccag ggactttgg ggccgtttt gtggcccgac 1020  
 ctgaggaagg gattcgatgt ggaatccgac ccgctcagga tatgtggttc tggtaggaga 1080  
 cgagaaccta aaacagtcc cgcctccgc tgaattttg ctttcggtt ggaaccgaag 1140  
 ccgcgcgtct tctctgctgc agcgtgcag catcgttctg tgtgtctct gtctgactgt 1200  
 gtttctgtat ttgtctgaaa attagggcca gactgttacc actccctaa gtttgacctt 1260  
 30 aggtcactgg aaagatgtcg agcggatcgc tcacaaccag tcggtagatg tcaagaagag 1320  
 acgttgggtt accttctgct ctgcagaatg gccaaccttt aacgtcggat ggccgcgaga 1380  
 cggcaccttt aaccgagacc tcataccca ggttaagatc aaggtcttt cactggccc 1440  
 gcatggacac ccagaccagg tccctacat cgtgacctg gaagccttg cttttgacct 1500  
 cctccctgg gtcaagccct ttgtacacc taagctccg cctctcttc ctccatccgc 1560  
 35 ccgctctct cccctgaac ctcctgttc gacccgcct cgatcctcc ttatccagc 1620  
 cctcactct tctctaggcg ccggaattcg ttaactcgag gatccggctg tggaatgtgt 1680  
 gtcagttagg gtgtggaaag tcccaggct cccagcagg cagaagtatg caaagcatgc 1740

atctcaatta gtcagcaacc aggtgtggaa agtccccagg ctccccagca ggcagaagta 1800  
 tgcaaaagcat gcattctcaat tagtcagcaa ccatagtccc gccctaact ccgcccatcc 1860  
 cgcctaac tccgccagt tccgccatt ctccgcccc tggctgacta attttttta 1920  
 tttatgcaga ggcgaggcc gcctcgccct ctgagctatt ccagaagtag tgaggaggct 1980  
 5 ttttggagg ctaggcttt tgcaaaaagc ttgggctgca agcttggtag cgagctcgga 2040  
 tcgatatctg cggccgctg gacggatgac gtgggcccgt gaaatggcgg acaccttct 2100  
 ggacaccatg cgggttgggc ccaggacgta cgcgacgta cgcgatgaga tcaataaaag 2160  
 gggcgctgag gaccgggagg cggccagaac cgcgtgac gaccggagc gtccctgct 2220  
 gcgtctccc gggctgctg ccgaaatgc cccaacgca tcttgggtg tggcacatcg 2280  
 10 aagaaccgc gggaccgtg ccgacagtc ccgtaatcc gtaaccgtt gaaattcagt 2340  
 ggatccacta gtaacggccg ccagtgtgct ggaattaatt cgctgtctg gagggccggc 2400  
 tgttgggtg agtactcct ctcaaaagcg ggcagctt ctgcgtaag attgtcagt 2460  
 tcaaaaaagc agaggagatt gatattcacc tggcccgcg tgatgcttt gaggtggcc 2520  
 gcgtccatct ggtcagaaa gacaatctt ttgtgtcaa gcttgaggc tggcaggctt 2580  
 15 gagatctggc cataacttg agtgacaatg acatccatt tgccttctc tccacaggc 2640  
 tccactcca ggtcaactg caggtcgac gagcatgat ctaggcgcc caattcgcc 2700  
 ctctccctc ccccccta acgttactg ccgaagccg ttggaataag gccggtgtg 2760  
 gttgtctat atgtgattt ccacatatt gccgtcttt ggcaatgta gggcccgaa 2820  
 acctggccct gtctcttga cgagcttcc taggggtct tccctctcg ccaaggaat 2880  
 20 gcaaggctg ttgaatgctg tgaaggaagc agttcctg gaagcttct gaagacaaac 2940  
 aacgtctgta ggcacctt gcaggcagc gaaccccc cctggcgaca ggtgcctctg 3000  
 cggccaaaag ccagtgatg aagatacacc tgcaaggcg gcacaaccc agtgccactg 3060  
 tgtgagttg atagttgag aaagagtaa atggtctcc tcaagcgtg tcaacaagg 3120  
 gctgaaggat gccagaagg taccattg tatgggaatc tgatctggg cctcggtgca 3180  
 25 catgcttac atgtgttag tcgaggtta aaaagctta ggcctccga accacggga 3240  
 cgtggtttc ctttgaaaa cacgatgata agcttgccac aacccggga taattctgc 3300  
 agccaatatg ggatggcca ttgaacaaga tggattgac gcaggttct cggccgctg 3360  
 ggtggagagg ctattcgct atgactggc acaacagaca atcggtgct ctgatgccg 3420  
 cgtgtccg ctgtcagcg agggcgccc ggttctttt gtcaagacc acctgtccg 3480  
 30 tgcctgaat gaactgcagg acgaggcagc gcgctatcg tggctggca cgacggcgt 3540  
 tcttgcga gctgtgctg acgtgtcac tgaagcgga agggactgc tgctattgg 3600  
 cgaagtgcg gggcaggatc tctgtcatc tcacctgct cctgccgaga aagtatccat 3660  
 catggtgat gcaatgcgc ggctgcatac gctgatccg gctacctgc cattcgaca 3720  
 ccaagcgaat catcgatcg agcgagcag tactcggtg gaagccggtc ttgtcgatca 3780  
 35 ggatgatctg gacgaagagc atcaggggct cgcgcagcc gaactgtcg ccaggctcaa 3840  
 ggcgcgatg cccgacggc aggatctct cgtgacctt ggcgatgct gcttgcgaa 3900  
 tatcatggtg gaaaatggc gctttcttg attcatgac tgtggcggc tgggtgtggc 3960

ggaccgctat caggacatag cgttggtac cgtgatatt gctgaagagc ttggcggcga 4020  
 atgggctgac cgcttctcg tgccttacgg tatcgccgct ccgattcgc agcgcatcgc 4080  
 ctctatcgc ctcttgacg agttctggc gaggcggatc tgatcaagag acaggatgag 4140  
 gatcgttctg cgcgggactc tggggttca taaaataaaa gattttattt agtctccaga 4200  
 5 aaaagggggg aatgaagac ccacactgta gggttgcaa gctagctta gtaacgcat 4260  
 tttgcaaggc atggaaaaat acataactga gaatagagaa gttcagatca aggtcaggaa 4320  
 cagatggaac agctgaatat gggccaaaca ggatatctgt ggtaagcagt tctgccccg 4380  
 gctcagggcc aagaacagat ggaacagctg aatatgggcc aaacaggata tctgtggtaa 4440  
 gcagttcctg ccccggtca gggccaagaa cagatggtcc ccagatgcgg tccagccctc 4500  
 10 agcagtttct agagaacat cagatgttct cagggtgccc caaggacctg aaatgacct 4560  
 gtgccttatt tgaactaacc aatcagttcg ctctcgtt ctgttcgcgc gcttctgctc 4620  
 cccgagctca ataaaagagc ccacaacccc tcaactgggg cgccagtcct ccgattgact 4680  
 gagtgcggcg ggtaccctg tatccaataa accctcttc agttgcatcc gacttgttgt 4740  
 ctgcgtgttc ctggggaggg tctccttga gtgattgact acccgtcagc gggggtcttt 4800  
 15 catttggggg ctgctcggg atcgggagac cctgcccag ggaccaccga cccaccaccg 4860  
 ggaggttaag tggctgcctc gcgcgttctg gtgatgacgg tgaacacctc tgacacatgc 4920  
 agtcccggga gacggtcaca gctgtctgt aagcggatgc cgggagcaga caagcccgctc 4980  
 agggcgcgct agcgggtgtt ggcggtgtc gggcgcgagc catgaccag tcacgtagcg 5040  
 atagcggagt gtactatgc ttaactatgc ggcacagag cagattgtac tgagagtga 5100  
 20 ccatatgcgg tgtgaaatac cgcacagatg cgtaaggaga aaataccgca tcaggcgctc 5160  
 ttccgcttc tcgctactg actcgtcgc ctgcgtgtt cggctgcgc gagcgggtatc 5220  
 agctcactca aaggcggtta tacggttatc cacagaatca ggggataacg caggaaagaa 5280  
 catgtgagca aaaggccagc aaaaggccag gaaccgtaaa aaggccgctg tgctggcggt 5340  
 tttccatagg ctccgcccc ctgacgagca tcacaaaaat cgacgctcaa gtcagagggtg 5400  
 25 gcgaaacccg acaggactat aaagatacca ggcgtttccc cctggaagct cctcgtgcg 5460  
 ctctctgtt ccgacctgc cgttaccgg atacctgtc gctttctcc ctccgggaag 5520  
 cgtggcgctt tctcatagct cagctgtag gtatctcagt tcggtgtagg tcgttcgctc 5580  
 caagctgggc tgtgtgcagc aacccccgt tcagccgac cgctgcgcct tatccggtaa 5640  
 ctatcgttct ggtccaacc cggtaagaca cgacttatcg cactggcag cagccactgg 5700  
 30 taacaggatt agcagagcga ggtatgtagg cgtgctaca gatttctga agtggtggcc 5760  
 taactacggc tactagaa ggacagtatt tggatctgc gctcgtga agccagttac 5820  
 ctccgaaaaa agagttggtg gctcttgatc cggcaaaaa accaccgctg gtagcggtgg 5880  
 ttttttgtt tgcaagcagc agattacgc cagaaaaaa ggtctcaag aagatcctt 5940  
 gatctttct acgggtctg acgtcagt gaacgaaac tcaggttaag ggatttgtt 6000  
 35 catgagatta tcaaaaagga tcttcacta gatcttta aattaaaaat gaagtttta 6060  
 atcaatctaa agtatatat agtaacttg gtctgacagt taccaatgct taatcagtga 6120  
 ggacattatc tcagcgtat gtctatttcg tcatccata gttgctgac tccccgctg 6180

gtagataact acgatacggg agggcttacc atctggcccc agtgctgcaa tgataccgcg 6240  
 agacccacgc tcaccggctc cagatttacc agcaataaac cagccagccg gaagggccga 6300  
 gcgcagaagt ggtcctgcaa ctttatccgc ctccatccag tctattaatt gttccggga 6360  
 agctagagta agtagttcgc cagttaatag ttgcgcaac gttgttgcca ttgctgcagg 6420  
 5 catcgtgggt tcacgctcgt cgtttggtat ggcttcattc agtcggtt cccaacgac 6480  
 aaggcgagtt acatgatccc ccatgttggt caaaaaagcg gttagctcct tcggtcctcc 6540  
 gatcgttgtc agaagtaagt tggccgcagt gttatcactc atggttatgg cagcactgca 6600  
 taattctctt actgtcatgc catccgtaag atgctttct gtgactgggt agtactcaac 6660  
 caagtcattc tgagaatagt gtatgcggcg accgagttgc tcttgcccg cgtcaacacg 6720  
 10 ggataatacc gcgccacata gcagaacttt aaaagtgc atcattggaa aacgttctc 6780  
 gggcgaaaa ctctcaagga tcttaccgt gttgagatcc agttcgatgt aaccactcg 6840  
 tgcacccaac tgatcttcag catcttttac ttcaccagc gtttctgggt gagcaaaaac 6900  
 aggaaggcaa aatgccgcaa aaaagggaat aaggcgaca cggaatgtt gaatactcat 6960  
 actcttctt tttcaatatt attgaagcat ttatcagggt tattgtctca tgagcgata 7020  
 15 catatttgaa tgtatttaga aaaataaaca aataggggt ccgcgcacat tccccgaaa 7080  
 agtgccacct gacgtctaag aaaccattat tatcatgaca ttaacctata aaaataggcg 7140  
 tatcacgagg cctttcgtc tcaa 7165

<210> 4

20 <211> 5874

<212> DNA

<213> Artificial Sequence

<220>

25 <223> Description of Artificial Sequence : recombinant  
vector

<400> 4

gaattgctag caattgctag caattgctag caattcatac cagatcacccg aaaactgtcc 60  
 30 tccaaatgtg tccccctcac actcccaaat tcgcggtt ctgcctctta gaccactcta 120  
 ccctattccc cacactcacc ggagccaaag ccgcggccct tccgtttctt tgcttttgaa 180  
 agaccccacc cgtaggtggc aagctagctt aagtaacgcc acttgcaag gcatggaaaa 240  
 atacataact gagaatagaa aagtcagat caaggtcagg aacaaagaaa cagctgaata 300  
 ccaaacagga tatctgtggt aagcgggtcc tgccccggt cagggccaa aacagatgag 360  
 35 acagctgagt gatggccaa acaggatata tgtgtaagc agttcctgcc cggctcggg 420  
 gccaaagaa gatggtcccc agatgcggtc cagccctcag cagtttctag tgaatcatca 480  
 gatgtttcca ggtgcccc aggacctgaa aatgacctg taccttattt gaactaacca 540



atcagttcgc ttctcgttc tgttcgcgcg ctcccgctct ccgagctcaa taaaagagcc 600  
 cacaaccct cactcggcgc gccagtcttc cgatagactg cgtcggccgg gtaccgtat 660  
 tccaataaa gcctcttgct gtttgcaccc gaatcgtggt ctgcgtgttc ctgggaggg 720  
 tctctctga gtgattgact acccacgacg ggggtctttc atttgggggc tcgtccggga 780  
 5 tttggagacc cgtgccagg gaccaccgac ccaccaccgg gaggtaagct ggccagcaac 840  
 ttatctgtgt ctgtccgatt gtctagtgtc tatgtttgat gttatgcgc tcgctctgta 900  
 ctagttagct aactagctct gtatctggcg gaccgtggt ggaactgacg agttctgaac 960  
 accggccgc aacctggga gacgtcccag ggactttggg ggccgtttt gtggcccgac 1020  
 ctgaggaagg gagtcgatgt ggaatccgac ccgctcagga tatgtgttc tggtaggaga 1080  
 10 cgagaacctt aaacagtcc cgctccgct tgaattttg ctttcggtt ggaaccgaag 1140  
 ccgcgcgtct tgtctgtgc agcgtgcag catcgttctg tgttctctct gtctgactgt 1200  
 gtttctgtat ttgtctgaaa attagggcca gactgttacc actccctaa gtttgacctt 1260  
 aggtcactgg aaagatgtcg agcggatgc tcacaaccag tcggtagatg tcaagaagag 1320  
 acgttgggtt acctctgct ctgcagaatg gccaacctt aacgtcggat ggccgcgaga 1380  
 15 cggcacctt accgagacc tcatcacca ggtaagatc aaggtcttt cacctggccc 1440  
 gcatggacac ccagaccagg tcccctacat cgtgacctgg gaagccttg ctttgacct 1500  
 ccctccctgg gtcaagccct ttgtacacc taagctccg cctctcttc ctcatccg 1560  
 cccgtctct cccctgaac ctctcgttc gaccccgct cgatccctc tttaccagc 1620  
 cctcactct tctctaggc ccggaattc ttaactcag gatccggctg tggaatgtgt 1680  
 20 gtcagttagg gtgtggaag tcccaggct cccagcagg cagaagtat caaagcatg 1740  
 atctcaatta gtacgaacc aggtgtgga agtcccagg ctcccagca ggcagaagta 1800  
 tgcaaaagcat gcattcaat tagtcagca ccatagtccc gccctaact ccgccatcc 1860  
 cgccctaac tcgccagc tccgccatt ctccgcccc tggctgacta attttttta 1920  
 tttatgca ggcgaggcc gcctcgct ctgagctatt ccagaagtag tgaggaggct 1980  
 25 ttttggagg ctaggcttt tgcaaaaagc ttgggctgca ggtcaggcg gatctgatca 2040  
 agagacagga tgaggatcgt ttgcacgat tgaacaagat ggattgcacg caggttctcc 2100  
 ggccgcttg gtggagaggc tattcggtc tgaactggga caacagaca tcggctgctc 2160  
 tgatgccgc gtgtccggc tgcagcgca gggcgcccg gttcttttg tcaagaccga 2220  
 cctgtccgt gcctgaatg aactgcagga cgaggcagc cggtatcgt ggctggccac 2280  
 30 gacggcggt ccttgcgag ctgtgctga cgtgtcact gaagcggga gggactggct 2340  
 gctattggc gaagtcccg ggcaggatct cctgtcatct cacctgtct ctgccagaa 2400  
 agtatccatc atggctgat caatcgcg cgtgcatac ctgatccg ctacctgcc 2460  
 attcgaccac caagcgaac atcgatcga gcgagcacgt actcgatgg aagccggtct 2520  
 tgtcgatcag gatgatctg acgaagagca tcaggggctc gcgccagcg aactgttcg 2580  
 35 caggctcaag gcgcgatgc ccgacggca ggaatcgtc gtgacctg gcgatccgt 2640  
 cttgccgaat atcatggtg aaaatggcg ctttctgga tcatcgact gtggccggct 2700  
 ggggtggcg gaccgtatc aggacatagc gttggctacc cgtgatattg ctgaagagct 2760

tggcggcgaa tgggctgacc gcttcctcgt gctttacggt atcgccgctc ccgattcgca 2820  
 gcgcacgccc ttctatcgcc ttcttgacga gttcttctga gcgggactct ggggttcgat 2880  
 aaaataaaag attttattta gtctccagaa aaagggggga atgaaagacc ccacctgtag 2940  
 gtttggaag ctacgttaag taacgccatt ttgcaaggca tggaaaaata cataactgag 3000  
 5 aatagagaag ttcagatcaa ggtcaggaac agatggaaca gctgaatatg ggccaaacag 3060  
 gatattctgt gtaagcagtt cctgccccgg ctcagggcca agaacagatg gaacagctga 3120  
 atatgggcca aacaggatat ctgtggtaag cagttcctgc cccggctcag ggccaagaac 3180  
 agatggctcc cagatgcggt ccagccctca gcagtttcta gagaaccatc agatgtttcc 3240  
 aggggtcccc aaggacctga aatgacctg tgccttattt gaactaacca atcagttcgc 3300  
 10 ttctcgttc tgttcgcgcg cttctgctcc ccgagctcaa taaaagagcc cacaaccct 3360  
 cactcggggc gccagtcctc cgattgactg agtcgcccgg gtaccctgt atccaataaa 3420  
 ccctcttga gttgcatccg acttggtgtc tcgctgtcc ttgggagggt ctctctgag 3480  
 tgattgacta cccgtcagcg ggggtcttc atttgggggc tcgtccggga tcgggagacc 3540  
 cctgcccagg gaccaccgac ccaccaccgg gaggttaagct ggctgcctcg cgcgtttcgg 3600  
 15 tgatgacggt gaaaacctct gacacatgca gtcccggag acggtcacag cttgtctgta 3660  
 agcggatgcc gggagcagac aagcccgta gggcgcgta cgggtgttg gcgggtgtcg 3720  
 gggcgcagcc atgaccaggt cagtagcga tagcggagt tatactggct taactatgcg 3780  
 gcatcagagc agattgtact gagagtgcac catatgcggt gtgaaatacc gcacagatgc 3840  
 gtaaggagaa aataccgcat caggcgtct tccgttctc cgctcactga ctgctgcgc 3900  
 20 tcggtcgttc ggctgcggcg agcggatca gtcactcaa aggcggtaat acggttatcc 3960  
 acagaatcag gggataacgc aggaagaac atgtagcaa aaggccagca aaaggccagg 4020  
 aaccgtaaaa aggcgcggtt gctggcggtt ttccataggc tccgcccc tgacgagcat 4080  
 caaaaaatc gacgtcaag tcagagggtg cgaaaccga caggactata aagataccag 4140  
 gcgtttccc ctggaagtc cctcgtgcgc tctcgttc cgacctgcc gcttaccgga 4200  
 25 tacctgtccg cttttctccc ttcgggaagc gtggcgctt ctcatagtc acgtgtagg 4260  
 tatctcagtt cgggttaggt cgctcgtcc aagctgggt gtgtgcagca acccccgtt 4320  
 cagcccgacc gctgcgctt atccggtaac tatcgtctt agtccaacc ggtaagacac 4380  
 gacttatcgc cactggcagc agccactggt aacaggatta gcagagcgag gtatgtaggc 4440  
 ggtgtacag agttcttgaa gtgtggcct aactacggct aactagaag gacagtattt 4500  
 30 ggtatctcgc ctctgtgaa gccagttacc ttcggaaaaa gattggtag ctcttgatcc 4560  
 ggcaaacaaa ccaccgtgg tagcgggtgt tttttgtt gcaagcagca gattacgcgc 4620  
 agaaaaaaag gatctcaaga agatccttg atctttcta cggggtctga cgctcagtg 4680  
 aacgaaaact caggttaagg gattttgtc atgagattat caaaaaggat cttcacctag 4740  
 atccttttaa attaaaaatg aagttttaa tcaatctaaa gtatatatga gtaaacttgg 4800  
 35 tctgacagtt accaatgctt aatcagttag gcacctatc cagcgatctg tctatttctg 4860  
 tcatccatag ttgctgact ccocgtcgt tagataacta cgatacggga gggcttacca 4920  
 tctggcccca gtgtgcaat gataccgca gaccacgct caccggctcc agatttatca 4980

gcaataaacc agccagccgg aagggccgag cgcagaagtg gtctgcaac ttatccgcc 5040  
 tccatccagt ctattaattg ttgccgggaa gctagagtaa gtagtcgcc agttaatagt 5100  
 ttgcgcaacg ttgttgccat tgctgcaggc atcgtgggtg cagctcgtc gtttggtatg 5160  
 gcttcattca gtcggttc ccaacgatca aggcgagtta catgatccc catgttggtc 5220  
 5 aaaaaagcgg ttagctcctt cggctcctcg atcgttgta gaagtaagtt ggccgcagt 5280  
 ttatcactca tggttatggc agcactgcat aattctctta ctgtcatgcc atccgtaaga 5340  
 tgctttctg tgactggtga gtactcaacc aagtcattct gagaatagt tatgcggcga 5400  
 ccgagttgct ctgcccggc gtcaacacgg gataataccg cgccacatag cagaacttta 5460  
 aagtgctca tcattgaaa acgttctcg gggcgaaaac tctcaaggat cttaccgtg 5520  
 10 ttgagatcca gttagatga acccactcgt gcaccaact gatcttcagc atcttttact 5580  
 ttaccagcg tttctgggtg agcaaaaaca ggaaggcaaa atgccgcaaa aaagggaata 5640  
 agggcgacac ggaaatgttg aatactcata ctcttcttt tcaatatta ttgaagcatt 5700  
 tatcagggtt attgtctcat gagcggatac atatttgaat gtatttagaa aaataaaca 5760  
 ataggggtc cgccacatt tccccgaaa gtgccacctg acgtctaaga aaccattatt 5820  
 15 atcatgacat taacctataa aaataggcgt atcacgagc ccttcgtct tcaa 5874

<210> 5

<211> 7546

<212> DNA

20 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence : recombinant

vector

25

<400> 5

gaattgctag caattgctag caattgctag caattcatac cagatcaccg aaaactgtcc 60  
 tccaaatgtg tccccctcac actcccaaat tcgcggtt ctgccttta gaccactcta 120  
 ccctattccc cacactcacc ggagccaaag ccgcgccct tccgtttctt tgcttttgaa 180  
 30 agacccacc cgtaggtggc aagtagctt aagtaacgc acttgcaag gcatggaaa 240  
 atacataact gagaatagaa aagtcagat caaggtcagg acaaagaaa cagctgaata 300  
 ccaaacagga tatctgtgtt aagcgttcc tgccccggct caggccaag aacagatgag 360  
 acagctgagt gatgggcaa acaggatata tgtgtaagc agttctgcc cggctcggg 420  
 gccaagaaca gatgtcccc agatgcgtc cagccctcag cagtttctag tgaatcatca 480  
 35 gatgtttca ggtgcccc aggacctgaa aatgacctg taccttatt gaactacca 540  
 atcagttcgc ttctcgttc tgttcgcgc ctccgtct ccgagctca taaaagagcc 600  
 cacaaccct cactcggcg gccagtctc cgatagactg cgtcgccgg gtaccgtat 660

tcccaataaa gctcttctgt gtttgcaccc gaatcgtggt ctcgctgttc ctggggaggg 720  
 tctcctctga gtgattgact acccacgacg ggggtctttc atttgggggc tcgtccggga 780  
 ttggagacc cctgcccagg gaccaccgac ccaccaccgg gaggtaaagt ggccagcaac 840  
 ttatctgtgt ctgtccgatt gtctagtgtc tatgtttgat gttatgcgcc tgcgtctgta 900  
 5 ctagttagct aactagctct gtatctggcg gacccgtggt ggaactgacg agttctgaac 960  
 accggccgc aacctggga gacgtcccag ggactttggg ggccgtttt ttggcccgac 1020  
 ctgaggaagg gagtcgatgt ggaatccgac cccgtcagga tatgtggttc tggtaggaga 1080  
 cgagaacctt aaacagttcc cgcctccgtc tgaattttg ctttcggtt ggaaccgaag 1140  
 ccgcgcgtct tgtctgtgc agcgtgcag catcgttctg tgtgtctct gtctgactgt 1200  
 10 gtttctgtat ttgtctgaaa attagggcca gactgttacc actcccttaa gtttgacctt 1260  
 aggtcactgg aaagatgtcg agcggatcgc tcacaaccag tcggtagatg tcaagaagag 1320  
 acgttgggtt accttctgt ctgcagaatg gccaaccttt aacgtcggat ggccgcgaga 1380  
 cggcaccttt aaccgagacc tcatacccca ggtaagatc aaggtctttt cacctggccc 1440  
 gcatggacac ccagaccagg tcccctacat cgtgacctgg gaagccttgg cttttgacct 1500  
 15 cctcctctgg gtcaagccct ttgtacaccc taagcctcgc cctcctcttc ctcctccgc 1560  
 cccgtctctc ccccttgaac ctctcgttc gaccccgct cgtcctccc tttatccagc 1620  
 cctcactcct tctctaggcg ccggaattcg ttaactcgag gatccggctg tggaatgtgt 1680  
 gtcagttagg gtgtggaaag tcccaggct cccagcagg cagaagtatg caaagatgc 1740  
 atctcaatta gtcagcaacc aggtgtggaa agtccccagg ctccccagca ggcagaagta 1800  
 20 tgcaaagcat gcattcatt tagtcagcaa ccatagtccc gccctaact ccgccatcc 1860  
 cgccctaac tcgcccagt tccgcccatt ctccgcccga tggctgacta attttttta 1920  
 tttatgcaga ggccgaggcc gctcggcct ctgagctatt ccagaagtag tgaggaggct 1980  
 tttttggagg cctaggcttt tgcaaaaagc ttgggtgca agcttggtac cgagctcgga 2040  
 tcgatatctg cggccgcgtc gacggatgaa cttgtaatg cttattctag cctctgggc 2100  
 25 cccggtcgcg ggtagtatgc ctgaattatc ctgactctt ttgatgaac ctccgcctt 2160  
 ggtggagacg gagccgttac cgcctctgtc cgtgtttcg gattaccgag tagagtattc 2220  
 cgaggcgcgc tgcgtgtccc gatcgggagg tgcactggag gctctgtgga cctgcgcgg 2280  
 gaacctgtcc gtgcccacgc cgacaccccg ggtgtactac cagacgtgg agggctacgc 2340  
 ggatcgagtg ccgacgccgg tggaggacgt ctccgaaagc ctgctgcaa aacgtactg 2400  
 30 gctccgggac tatcgtgttc cccaacgcac aaaactcgtg ttgttctact tttcccctg 2460  
 ccaccaatgc caaacttatt atgtagagtg cgaaccccg tgcctcgtgc cttgggttcc 2520  
 cctgtggagc tcgttagagg acatcgaacg actattgttc gaagatcgcc gtctaattgc 2580  
 gtactacgcg ctcacgatta agtcggcgca gtatcgtg atgatggtg cagtattca 2640  
 agtgttttg gggctgtatg tgaaggttg gctgcaccga cattttccct ggtgttttc 2700  
 35 ggaccagtgg tgaattcag tggatccact agtaacggcc gccagtgtgc tggaattaat 2760  
 tcgctgtctg cgaggcccg ctgttgggtt gactactccc tctcaaaagc gggcatgact 2820  
 tctgcgctaa gattgtcagt ttccaaaac gaggaggatt tgatattcac ctggcccgcg 2880

gtgatgcctt tgagggtggc cgcgtccatc tggtcagaaa agacaatctt tttgtgtca 2940  
 agcttgaggt gtggcaggct tgagatctgg ccatacactt gaggacaat gacatccact 3000  
 ttgcctttct ctccacaggt gtccactccc aggtccaact gcaggtcgat cgagcatgca 3060  
 tctagggcgg ccaattgcc cctctccctc cccccccct aacgttactg gccgaagccg 3120  
 5 cttggaataa ggccgggtgtg tgtttgtcta tatgtgattt tccaccatat tgcgtcttt 3180  
 tggcaatgtg agggcccgga aacctggccc tgtcttcttg acgagcattc ctagggtct 3240  
 ttccctctc gccaaaggaa tgcaaggtct gttgaatgtc gtgaaggaag cagttcctct 3300  
 ggaagcttct tgaagacaaa caacgtctgt agcgaccctt tgcaggcagc ggaaccccc 3360  
 acctggcgac aggtgcctct gcggccaaaa gccacgtgta taagatacac ctgcaaaggc 3420  
 10 ggcacaaccc cagtgccacg ttgtgagttg gatagttgtg gaaagagtca aatggctctc 3480  
 ctcaagcgta gtcaacaagg ggctgaagga tgcacagaag gtacccatt gtatgggaat 3540  
 ctgatctggg gcctcggtgc acatgcttta catgtgttta gtcgagggtta aaaaagctct 3600  
 agggccccc aaccacgggg acgtggtttt cctttgaaaa acacgatgat aagcttgcca 3660  
 caaccccgga ataattctg cagccaatat gggatcggcc attgaacaag atggattgca 3720  
 15 cgcaggttct ccggccgctt ggttgagag gctattcggc tatgactggg cacaacagac 3780  
 aatcggtgc tctgatccg ccgtgtccg gctgtcagc cagggcgcc cggttcttt 3840  
 tgtcaagacc gacctgtccg gtgccctgaa tgaactgcag gacgaggcag cgcggctatc 3900  
 gtggctggcc acgacggggc ttccttgccg agctgtgctc gacgttgta ctgaagcggg 3960  
 aagggaactg ctgctattgg gcgaagtgc ggggcaggat ctctgtcat ctaccttgc 4020  
 20 tctgccag aaagtatcca tcatggctga tgcaatgcgg cggctgcata cgcttgatcc 4080  
 ggctacctgc ccattcgacc accaagcgaa acatcgatc gaggagcac gtactcggat 4140  
 ggaagccggt cttgtgatc aggatgatct ggacgaagag catcaggggc tcgcccagc 4200  
 cgaactgttc gccaggctca aggcgcgat gccgacggc gaggatctcg tcgtgacca 4260  
 tggcgatgcc tgcttgcca atatcatggt ggaaaatggc cgctttctg gattcatga 4320  
 25 ctgtggccgg ctgggtgtgg cggaccgcta tcaggacata gcgttgcta cccgtgat 4380  
 tgctgaagag cttggcggcg aatgggtga ccgttctc gtgctttac gtatgccgc 4440  
 tccgattcg cagcgatcg ccttctatc ccttctgac gatttctgt cgaggcgat 4500  
 ctgatcaaga gacaggatga ggatcgttc gcgcgggact ctggggttcg ataaaataa 4560  
 agattttatt tagtctccag aaaaagggg gaataaaga cccacactg aggtttggca 4620  
 30 agctagctta agtaacgcca tttgcaagg catggaaaaa tacataactg agaatagaga 4680  
 agttcagatc aaggtcagga acagatggaa cagctgaata tggccaaac aggatctctg 4740  
 tggtaagcag ttctgcccc ggctcaggc caagaacaga tggaaacgt gaatatgggc 4800  
 caaacaggat atctgtgta agcagttct gcccggtc agggccaaga acagatggtc 4860  
 cccagatgcg gtccagcct cagcagttc tagagaacca tcagatgtt ccagggtgcc 4920  
 35 ccaaggacct gaaatgacc tgtgcctat ttgaactaac caatcagttc gtttctcgt 4980  
 tctgttcgg cgcttctgt ccccgagctc aataaaagag ccacaaccc ctactcggg 5040  
 gcgcagtc tccgattgac tgatcgccc ggtaccctg gtatccaata aacctcttg 5100

cagttgcac cgacttgtgg tctcgtgtt ccttgggagg gtctcctctg agtgattgac 5160  
 taccctcag cgggggtctt tcatttgggg gctcgtccgg gatcgggaga ccctgccc 5220  
 gggaccaccg acccaccacc gggaggtaag ctggctgcct cgcgcgttc ggtgatgacg 5280  
 gtgaaaacct ctgacacatg cagctcccgg agacgggtcac agcttgtctg taagcggatg 5340  
 5 cggggagcag acaagcccgt cagggcgcgt cagcgggtgt tggcgggtgt cggggcgag 5400  
 ccatgaccca gtcacgtagc gatagcggag tgtatactgg cttactatg cggcatcaga 5460  
 gcagattgta ctgagagtgc accatatgcg gtgtgaaata ccgacagat gcgtaaggag 5520  
 aaaataccgc atcaggcgcgt cttccgcttc ctgctcact gactcgtgc gctcggctgt 5580  
 tcggctgcgg cgagcggat cagctcactc aaaggcggta atacggttat ccacagaatc 5640  
 10 aggggataac gcaggaaaga acatgtgagc aaaaggccag caaaaggcca ggaaccgtaa 5700  
 aaaggccgag ttgctggcgt tttccatag gctccgccc cctgacgagc atcacaaaaa 5760  
 tcgacgtca agtcagaggt ggcgaaaccc gacaggacta taaagatacc aggcgtttcc 5820  
 ccttgaagc tccctcgtgc gctcctctgt tccgacctg ccgcttaccg gatacctgc 5880  
 cgctttctc cttcgggaa gcgtggcgcgt ttctcatag tcacgtgta ggtatctcag 5940  
 15 ttcggttag gtcgttcgt ccaagctggg ctgtgtgcac gaacccccg ttcagccga 6000  
 ccgtcgcgc ttatccgta actatcgtct tgagtccaac ccgtaagac acgacttate 6060  
 gccactggca gcagccactg gtaacaggat tagcagagcg aggtatgtag gcggtgctac 6120  
 agagtcttg aagtggggc ctaactacgg ctactaga aggacagtat ttggtatctg 6180  
 cgctcgtcg aagccagta cttcggaaa aagagttggt agctcttgat ccggcaaca 6240  
 20 aaccaccgt gtagcgggt gttttttgt ttgcaagcag cagattacgc gcagaaaaa 6300  
 aggatctcaa gaagatcctt tgatctttc tacggggtct gacgtcagt ggaacgaaa 6360  
 ctacgtaaa gggattttg tcatgagatt atcaaaaagg atctcacct agatccttt 6420  
 aaattaaaa tgaagttta aatcaatcta aagtatatat gagtaaaact ggtctgacag 6480  
 ttacaaatgc ttaatcagt aggcacatat ctacgcgat gtctatttc gttcatcat 6540  
 25 agttgcctga ctcccgtcg ttagataac tacgatacgg gagggcttac catctggccc 6600  
 cagtgtcga atgataccgc gagaccacg ctacccggt ccagatttat cagcaataaa 6660  
 ccagccagcc ggaaggggcg agcgagaag tggctcgtca actttatcc cctccatcca 6720  
 gtctattaat tgttccggg aagctagagt aagtagttcg ccagttaata gtttgcgaa 6780  
 cgttgttgc attgtcgag gcacgtggt gtcacgtcg tcttttgta tggcttcatt 6840  
 30 cagctccgt tcccaacgat caaggcgagt tacatgatcc ccatgttgt gcaaaaaagc 6900  
 ggttagctcc ttcggtctc cgtcgttgt cagaagtaag ttggccgag tgttatcact 6960  
 catggttatg gcagcactgc ataattctct tactgtcat ccatccgta gatgctttc 7020  
 tgtactggt gactactcaa ccaagtcatt ctgagaatag tgtatcggc gaccagttg 7080  
 ctctgcccg gcgtcaaac gggataatac cgcgccacat agcagaact taaaagtgt 7140  
 35 catcattgga aaacgttct cggggcgaaa actctcaagg atcttaccg tgttgagatc 7200  
 cagttcgatg taaccactc gtgacccaa ctgatctca gcactttta ctttaccag 7260  
 cgtttctggg tgagcaaaaa caggaaggca aaatgccgca aaaaaggga taaggcgac 7320

acggaaatgt tgaatactca tactcttct tttcaatat tattgaagca ttatcaggg 7380  
ttattgtctc atgagcggat acatatttga atgtatttag aaaaataaac aaataggggt 7440  
tccgcgcaca tttcccgaa aagtccacc tgacgtctaa gaaaccatta ttatcatgac 7500  
attaacctat aaaaataggc gtatcacgag gcccttctgt cttcaa 7546

5

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/00733

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C12N15/86 C12N15/34 C12N15/38 C12N5/10 A61K48/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                | Relevant to claim No. |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| X          | WO 95 15384 A (JOHNSON DAVID C ;YORK IAN A (CA)) 8 June 1995<br>see page 11, line 20 - page 17, line 27<br>see page 30, line 22 - page 31, line 9<br>see page 49, line 7 - page 51, line 3<br>--- | 1-25                  |
| X          | WO 96 04383 A (CAMPBELL ANN E ;AMERICAN CYANAMID CO (US)) 15 February 1996<br>see page 8, line 16 - page 14, column 15<br>---<br>-/--                                                             | 1-25                  |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

23 June 1999

Date of mailing of the international search report

06/07/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Sitch, W



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/00733

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category    | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                                                                                                                    | Relevant to claim No. |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| X           | BRUDER J T ET AL: "Expression of gp19K increases the persistence of transgene expression from an adenovirus vector in the mouse lung and liver."<br>JOURNAL OF VIROLOGY, (1997 OCT) 71 (10) 7623-8. JOURNAL CODE: KCV. ISSN: 0022-538X., XP002106932<br>United States<br>see the whole document<br>----                                                                                                                                               | 1-20, 22, 23          |
| X           | MARCONI, PEGGY ET AL:<br>"Replication-defective herpes simplex virus vectors for gene transfer in vivo"<br>PROC. NATL. ACAD. SCI. U. S. A. (1996), 93(21), 11319-11320 CODEN: PNASA6; ISSN: 0027-8424, XP002106933<br>see the whole document<br>----                                                                                                                                                                                                  | 1-25                  |
| X           | WO 96 31241 A (CELL GENESYS INC ;OTTEN GILLIS R (US)) 10 October 1996<br>see page 4, line 3 - page 11, line 19<br>----                                                                                                                                                                                                                                                                                                                                | 1-25                  |
| X           | YORK ET AL: "A CYTOSOLIC HERPES SIMPLEX VIRUS PROTEIN INHIBITS ANTIGEN PRESENTATION TO CD8+ T LYMPHOCYTES"<br>CELL,<br>vol. 77, 1994, pages 525-535, XP002106934<br>cited in the application<br>see page 525<br>see page 529, paragraph 2 - paragraph 4<br>see abstract<br>----                                                                                                                                                                       | 1-25                  |
| X<br>A<br>A | WO 97 30108 A (UNIV VANDERBILT ;UNIV WASHINGTON (US)) 21 August 1997<br>see page 41, line 7 - page 49, line 19<br>----<br>JONES ET AL: "MULTIPLE INDEPENDENT LOCI WITHIN THE HUMAN CYTOMEGALOVIRUS UNIQUE SHORT REGION DOWN-REGULATE EXPRESSION OF MAJOR HISTOCOMPATIBILITY COMPLEX CLASS I HEAVY CHAINS"<br>JOURNAL OF VIROLOGY,<br>vol. 69, 1995, pages 4830-4841, XP002106935<br>cited in the application<br>see page 4830<br>see abstract<br>---- | 25                    |
| A           | SHULL ET AL: "HUMORAL IMMUNE RESPONSE LIMITS GENE THERAPY IN CANINE MPS I"<br>BLOOD,<br>vol. 88, 1996, pages 377-379, XP002106936<br>cited in the application<br>see the whole document<br>-----                                                                                                                                                                                                                                                      |                       |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/00733

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
| WO 9515384 A                              | 08-06-1995          | US 5750398 A               | 12-05-1998          |
|                                           |                     | AU 690601 B                | 30-04-1998          |
|                                           |                     | AU 1061195 A               | 19-06-1995          |
|                                           |                     | CA 2177699 A               | 08-06-1995          |
|                                           |                     | EP 0731839 A               | 18-09-1996          |
|                                           |                     | JP 9506252 T               | 24-06-1997          |
|                                           |                     | US 5858376 A               | 12-01-1999          |
| WO 9604383 A                              | 15-02-1996          | US 5846806 A               | 08-12-1998          |
|                                           |                     | AU 3153595 A               | 04-03-1996          |
|                                           |                     | AU 3274595 A               | 04-03-1996          |
|                                           |                     | CA 2195668 A               | 15-02-1996          |
|                                           |                     | CA 2196207 A               | 15-02-1996          |
|                                           |                     | EP 0775209 A               | 28-05-1997          |
|                                           |                     | EP 0772681 A               | 14-05-1997          |
|                                           |                     | FI 970351 A                | 28-01-1997          |
|                                           |                     | FI 970352 A                | 28-01-1997          |
|                                           |                     | JP 10503378 T              | 31-03-1998          |
|                                           |                     | JP 10506268 T              | 23-06-1998          |
|                                           |                     | NO 970369 A                | 21-03-1997          |
|                                           |                     | NO 970370 A                | 24-03-1997          |
|                                           |                     | NZ 290718 A                | 29-03-1999          |
|                                           |                     | NZ 291571 A                | 28-01-1999          |
|                                           |                     | WO 9604384 A               | 15-02-1996          |
|                                           |                     | US 5753476 A               | 19-05-1998          |
|                                           |                     | US 5720957 A               | 24-02-1998          |
|                                           |                     | US 5843458 A               | 01-12-1998          |
| WO 9631241 A                              | 10-10-1996          | AU 5533896 A               | 23-10-1996          |
|                                           |                     | EP 0820311 A               | 28-01-1998          |
|                                           |                     | JP 11503024 T              | 23-03-1999          |
|                                           |                     | NO 974596 A                | 03-12-1997          |
| WO 9730108 A                              | 21-08-1997          | US 5891857 A               | 06-04-1999          |
|                                           |                     | AU 2065397 A               | 02-09-1997          |